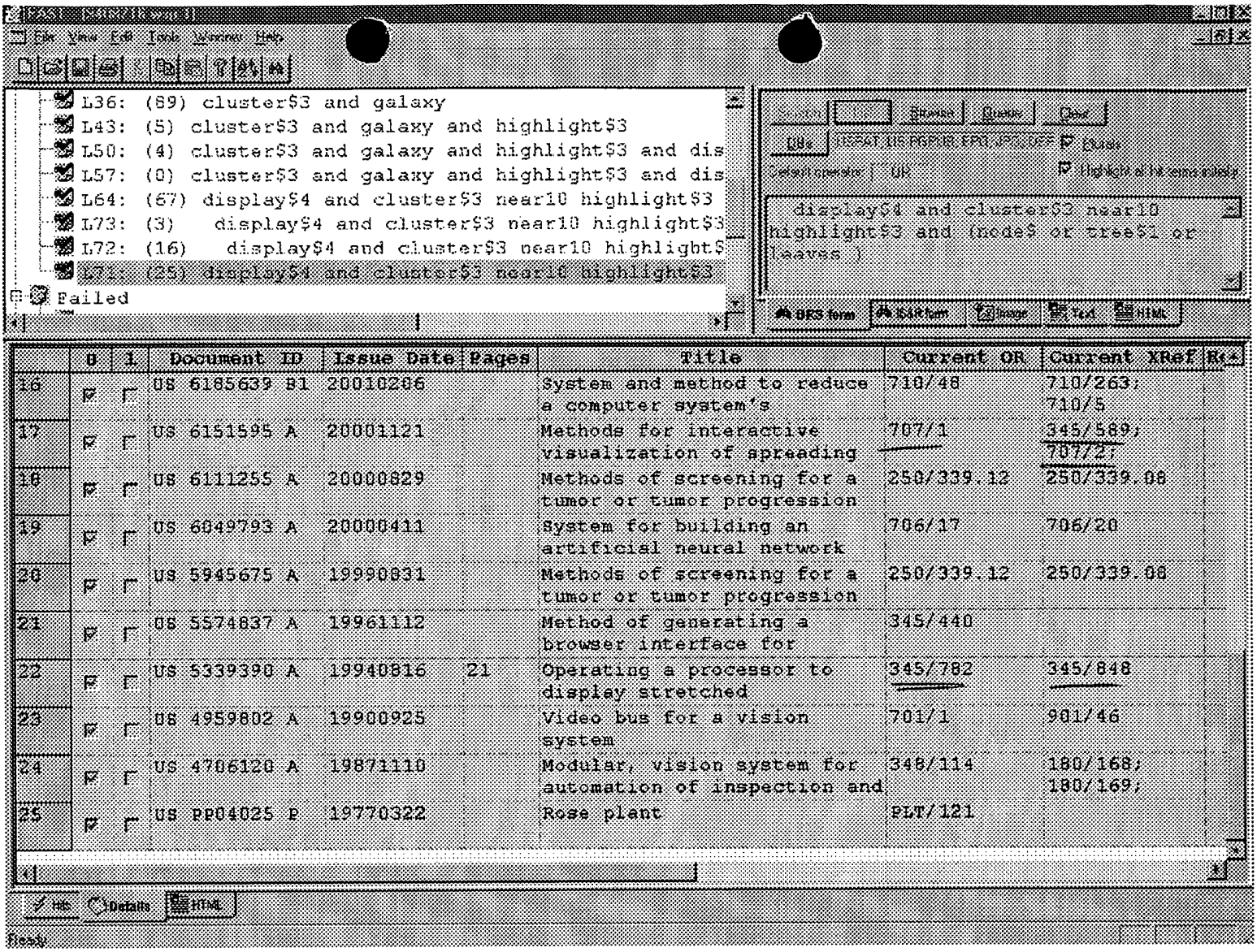
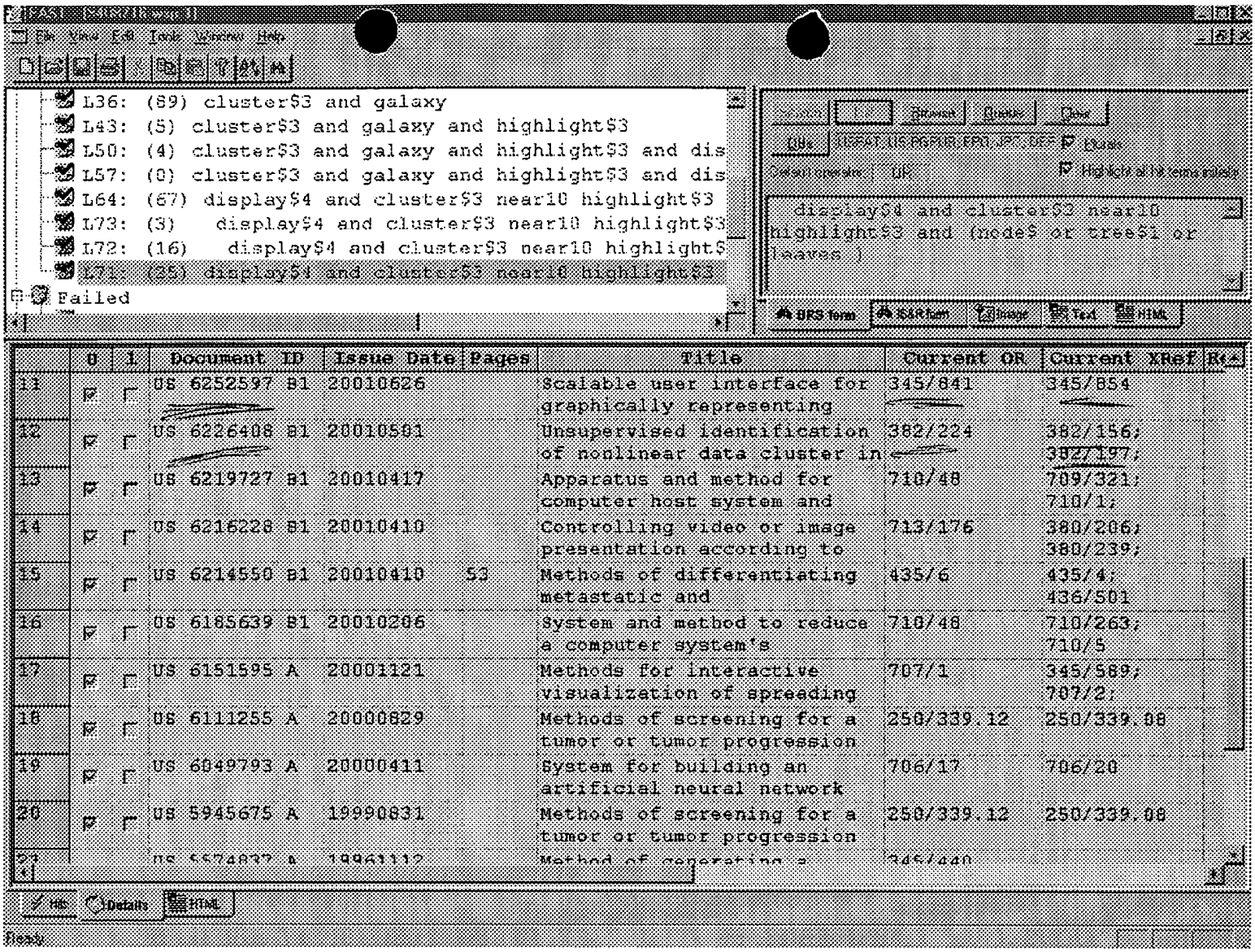
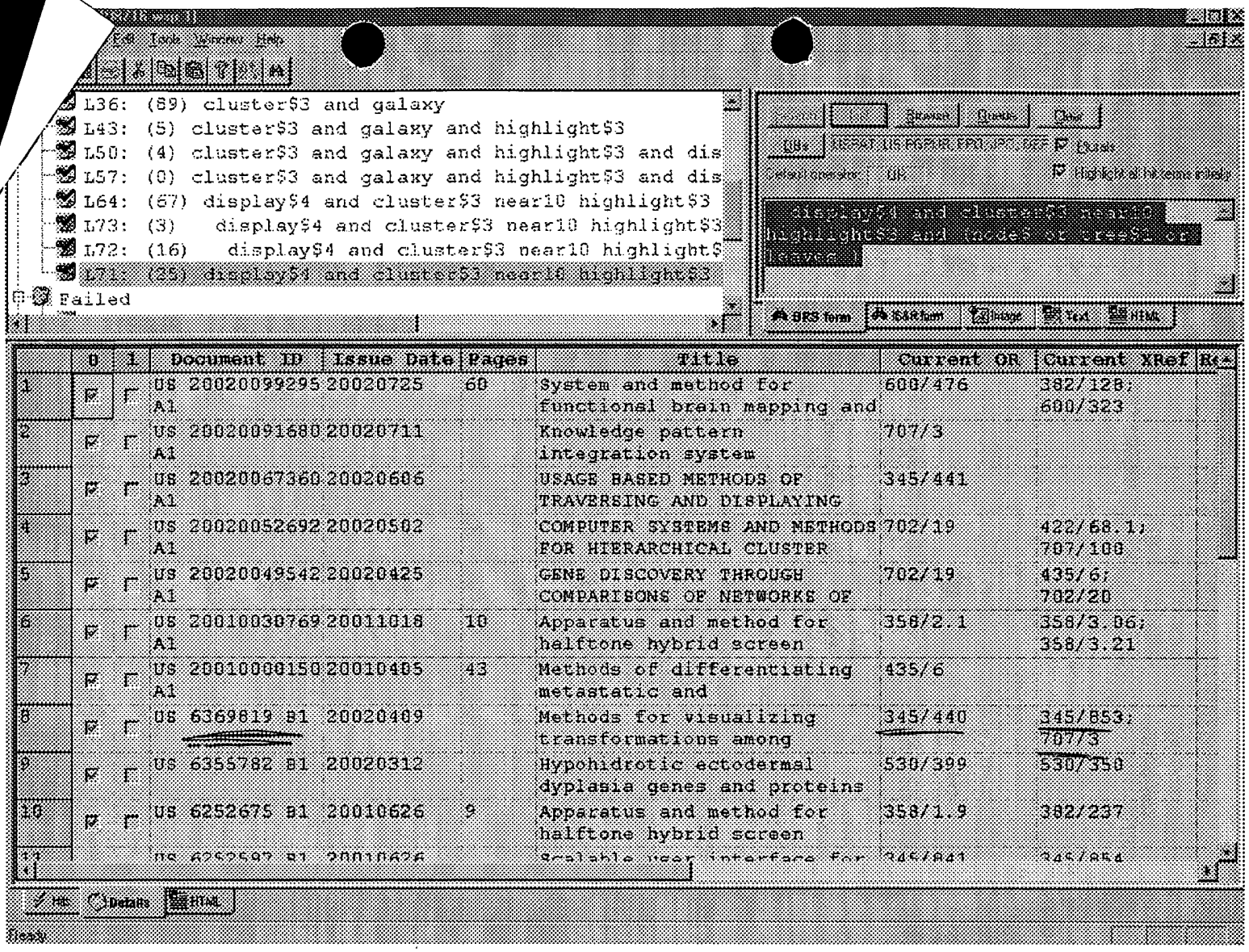
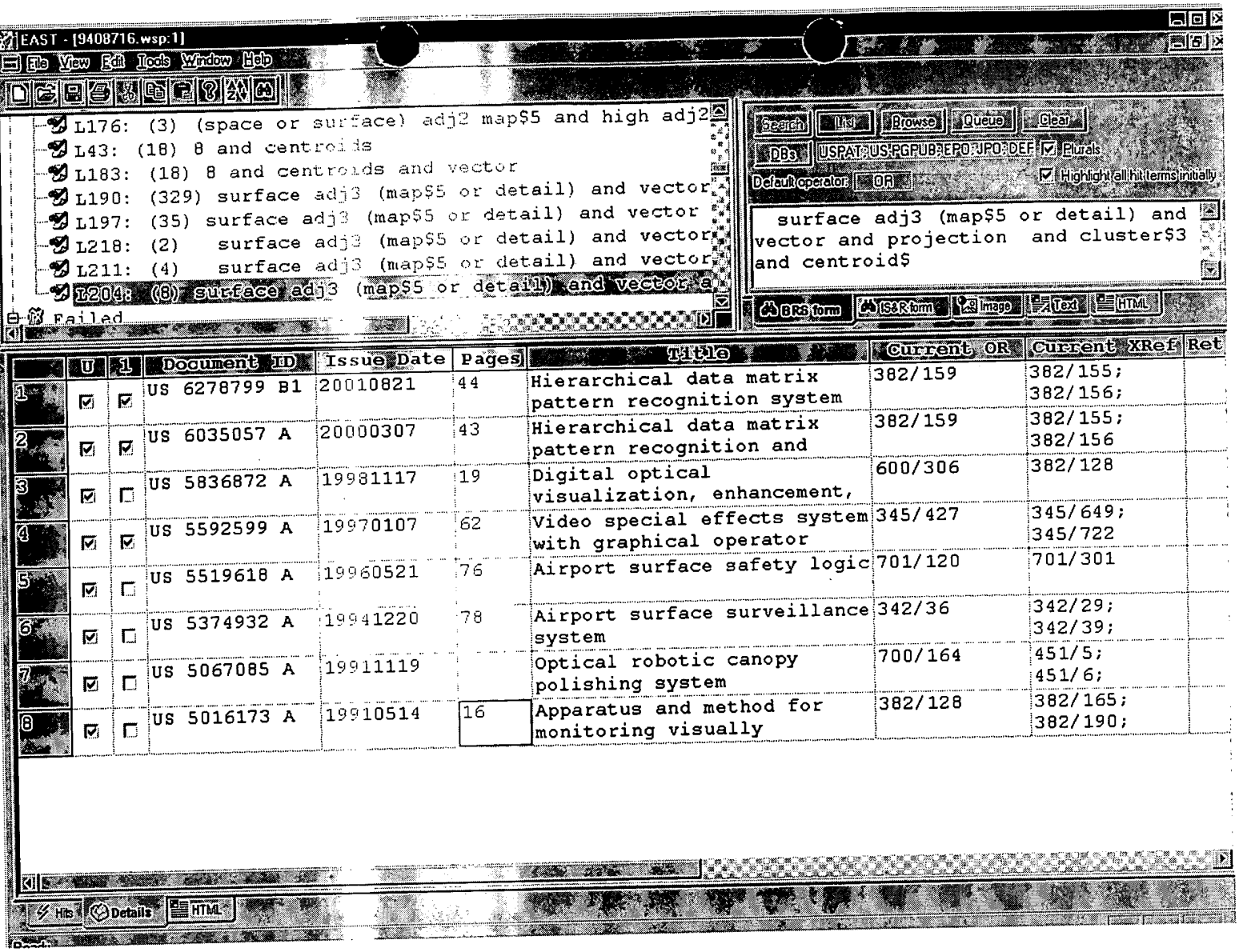
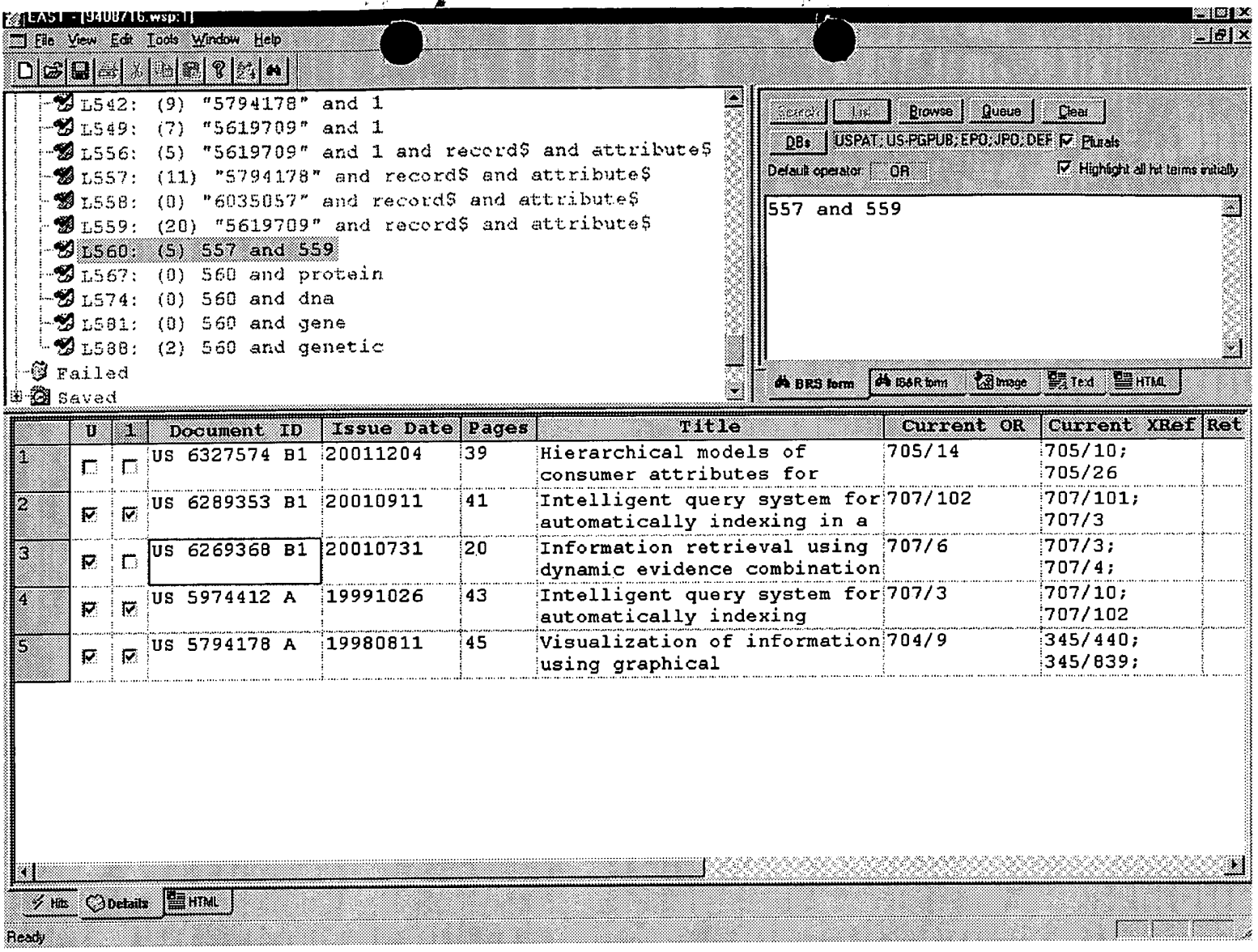

L36: (89) cluster$3 and galaxy
L43: (5) cluster$3 and galaxy and highlight$3
L50: (4) cluster$3 and galaxy and highlight$3 and dis
L57: (0) cluster$3 and galaxy and highlight$3 and dis
L64: (67) display$4 and cluster$3 near10 highlight$3
L73: (3) display$4 and cluster$3 near10 highlight$3
L72: (16) display$4 and cluster$3 near10 highlight$
L71: (25) display$4 and cluster$3 near10 highlight$3
Failed
display$4 and cluster$3 near10 highlight$3 and (node$ or tree$1 or leaves)
Document ID
Issue Date
Pages
Title
Current OR
Current XRef
16 US 6185639 B1 20010206 System and method to reduce a computer system's 710/48 710/263; 710/5
17 US 6151595 A 20001121 Methods for interactive visualization of spreading 707/1 345/589; 707/2;
18 US 6111255 A 20000829 Methods of screening for a tumor or tumor progression 250/339.12 250/339.08
19 US 6049793 A 20000411 System for building an artificial neural network 706/17 706/20
20 US 5945675 A 19990831 Methods of screening for a tumor or tumor progression 250/339.12 250/339.08
21 US 5574837 A 19961112 Method of generating a browser interface for 345/440
22 US 5339390 A 19940816 21 Operating a processor to display stretched 345/782 345/848
23 US 4959802 A 19900925 Video bus for a vision system 701/1 901/46
24 US 4706120 A 19871110 Modular, vision system for automation of inspection and 348/114 180/168; 180/169;
25 US PP04025 P 19770322 Rose plant PLT/121

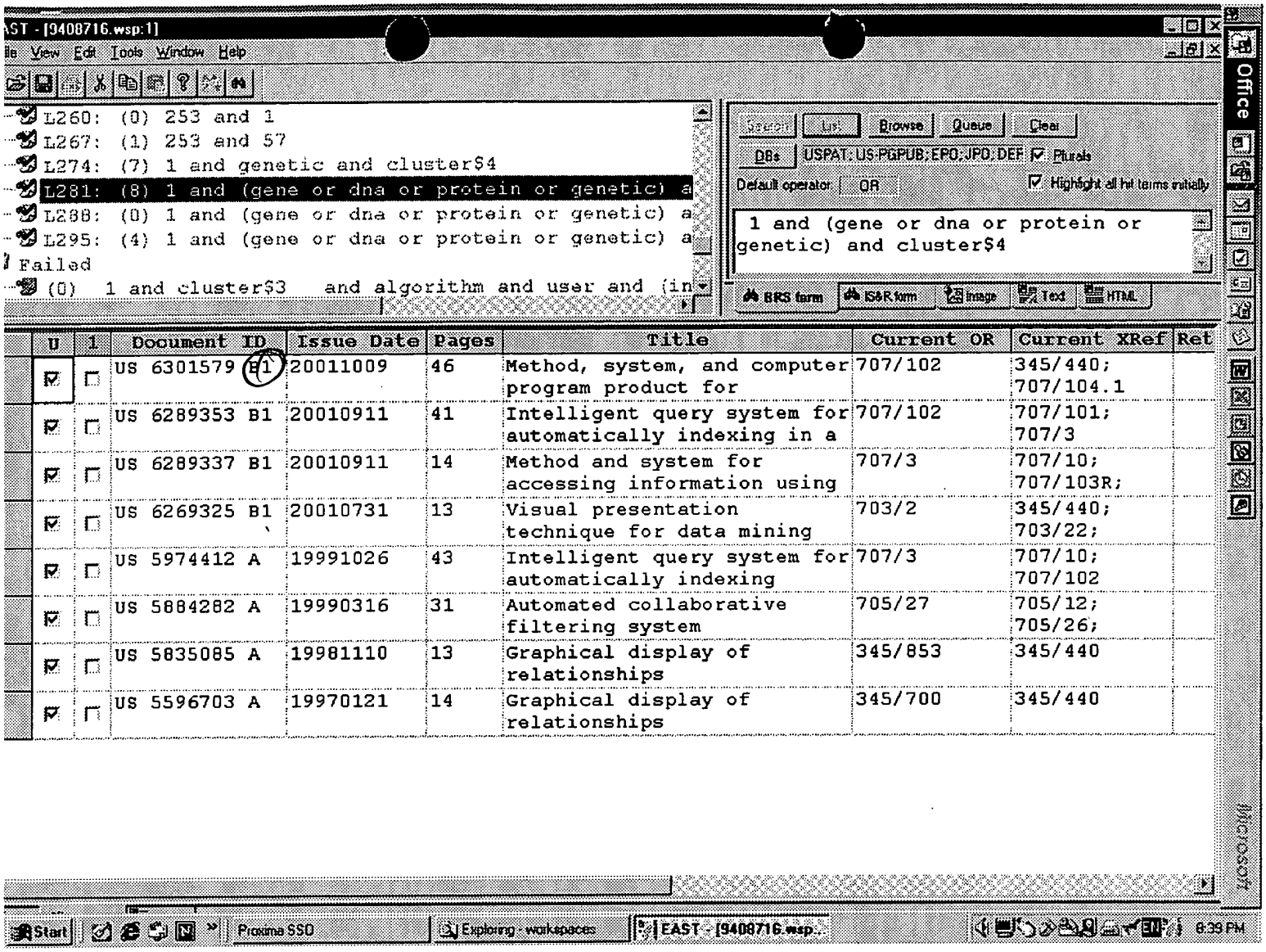

L36: (69) cluster$3 and galaxy
L43: (5) cluster$3 and galaxy and highlight$3
L50: (4) cluster$3 and galaxy and highlight$3 and dis
L57: (0) cluster$3 and galaxy and highlight$3 and dis
L64: (67) display$4 and cluster$3 near10 highlight$3
L73: (3) display$4 and cluster$3 near10 highlight$3
L72: (16) display$4 and cluster$3 near10 highlight$
L71: (25) display$4 and cluster$3 near10 highlight$3
Failed
display$4 and cluster$3 near10 highlight$3 and (node$ or tree$1 or leaves)
Document ID
Issue Date
Pages
Title
Current OR
Current XRef
US 6252597 B1 20010626 Scalable user interface for graphically representing 345/841 345/854
US 6226408 B1 20010501 Unsupervised identification of nonlinear data cluster in 382/224 382/156; 382/197;
US 6219727 B1 20010417 Apparatus and method for computer host system and 710/48 709/321; 710/1;
US 6216228 B1 20010410 Controlling video or image presentation according to 713/176 380/206; 380/239;
US 6214550 B1 20010410 53 Methods of differentiating metastatic and 435/6 435/4; 436/501
US 6185639 B1 20010206 System and method to reduce a computer system's 710/48 710/263; 710/5
US 6151595 A 20001121 Methods for interactive visualization of spreading 707/1 345/589; 707/2;
US 6111255 A 20000829 Methods of screening for a tumor or tumor progression 250/339.12 250/339.08
US 6049793 A 20000411 System for building an artificial neural network 706/17 706/20
US 5945675 A 19990831 Methods of screening for a tumor or tumor progression 250/339.12 250/339.08
Details
HTML
Ready

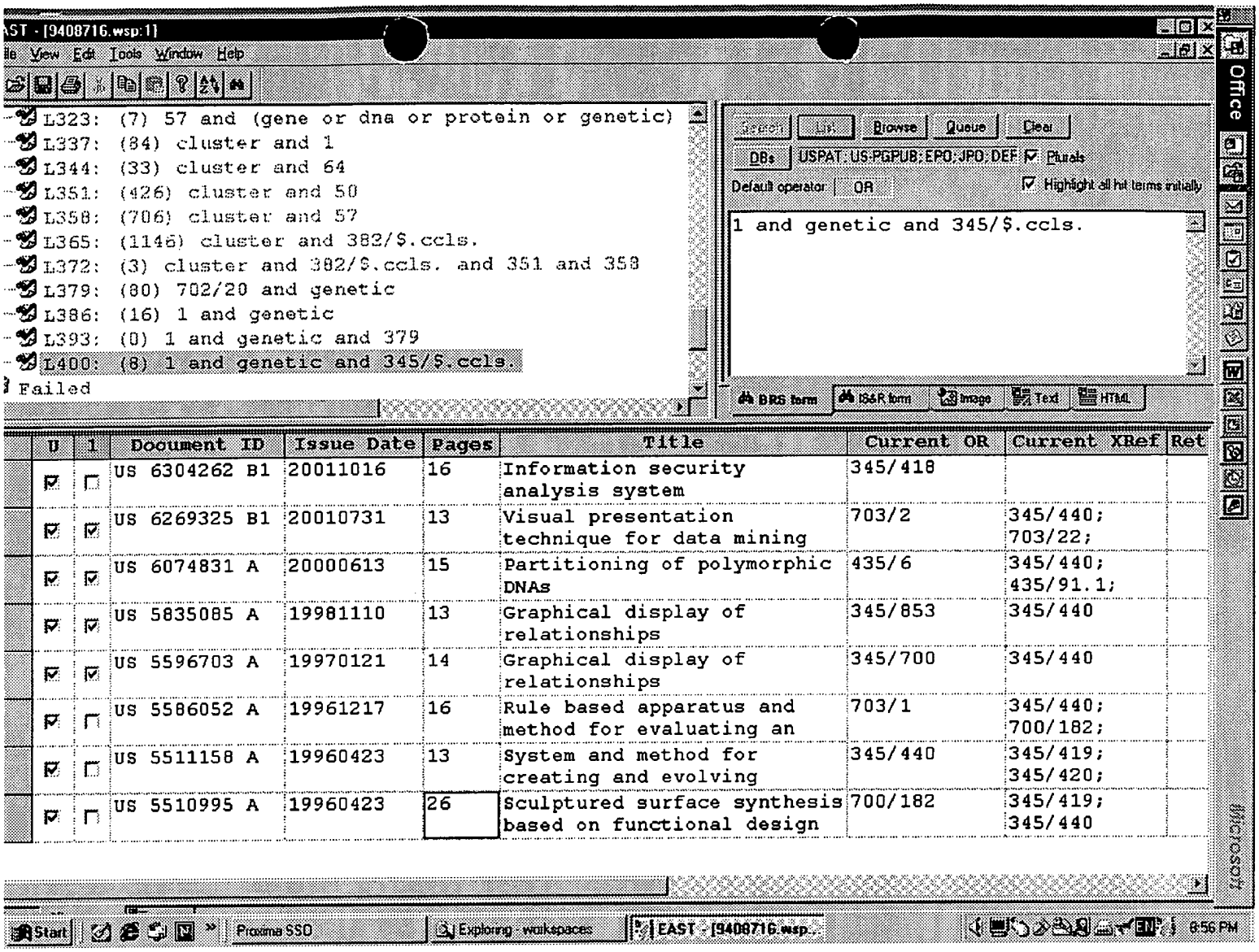

L36: (89) cluster$3 and galaxy
L43: (5) cluster$3 and galaxy and highlight$3
L50: (4) cluster$3 and galaxy and highlight$3 and dis
L57: (0) cluster$3 and galaxy and highlight$3 and dis
L64: (67) display$4 and cluster$3 near10 highlight$3
L73: (3) display$4 and cluster$3 near10 highlight$3
L72: (16) display$4 and cluster$3 near10 highlight$
L71: (25) display$4 and cluster$3 near10 highlight$3
Failed
display$4 and cluster$3 near10
highlight$3 and image$3 or area$2 or
leaves
Details
HTML

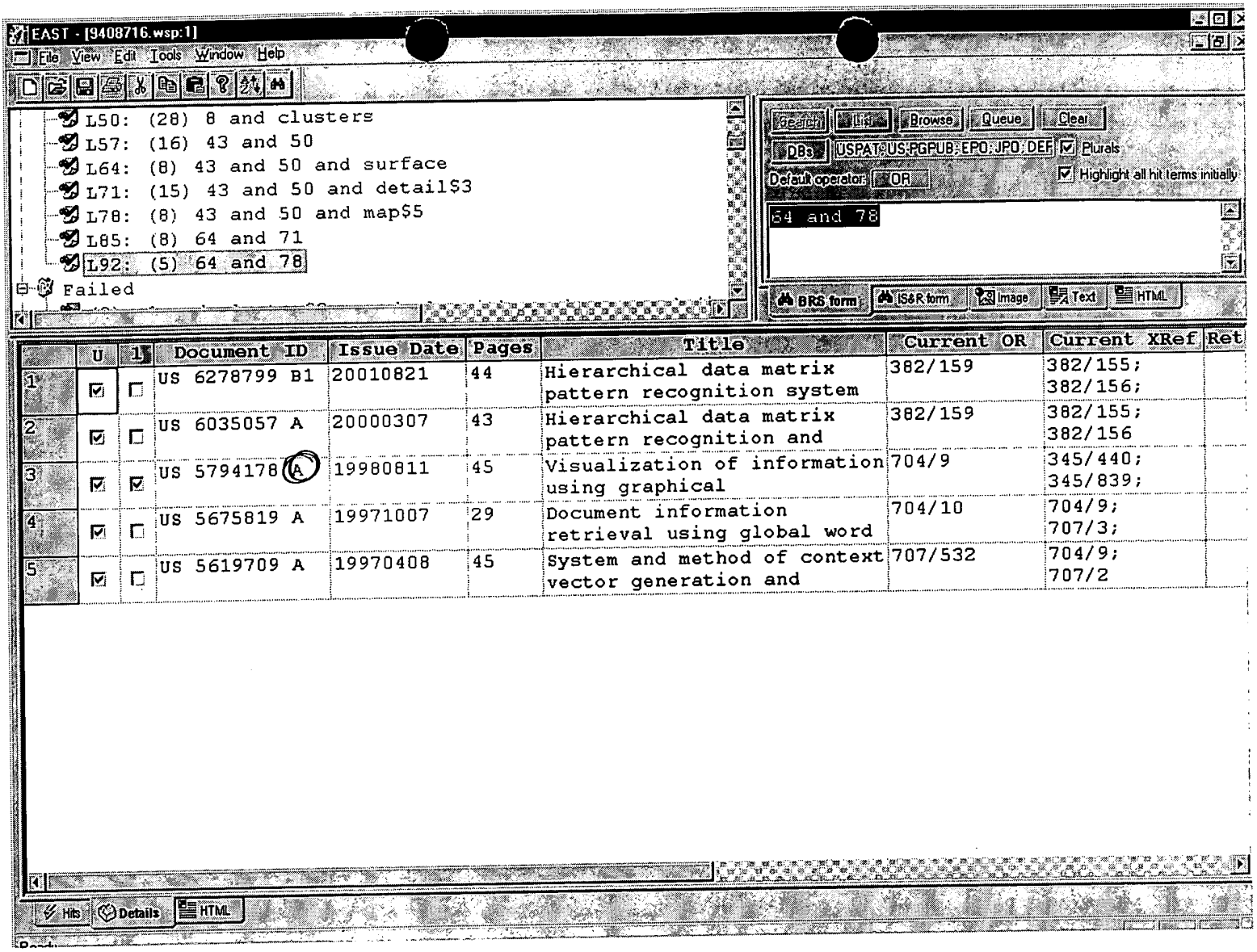


	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Ret
1	☑	☑	US 6278799 B1	20010821	44	Hierarchical data matrix pattern recognition system	382/159	382/155; 382/156;	
2	☑	☑	US 6035057 A	20000307	43	Hierarchical data matrix pattern recognition and	382/159	382/155; 382/156	
3	☑	☐	US 5836872 A	19981117	19	Digital optical visualization, enhancement,	600/306	382/128	
4	☑	☑	US 5592599 A	19970107	62	Video special effects system with graphical operator	345/427	345/649; 345/722	
5	☑	☐	US 5519618 A	19960521	76	Airport surface safety logic	701/120	701/301	
6	☑	☐	US 5374932 A	19941220	78	Airport surface surveillance system	342/36	342/29; 342/39;	
7	☑	☐	US 5067085 A	19911119		Optical robotic canopy polishing system	700/164	451/5; 451/6;	
8	☑	☐	US 5016173 A	19910514	16	Apparatus and method for monitoring visually	382/128	382/165; 382/190;	

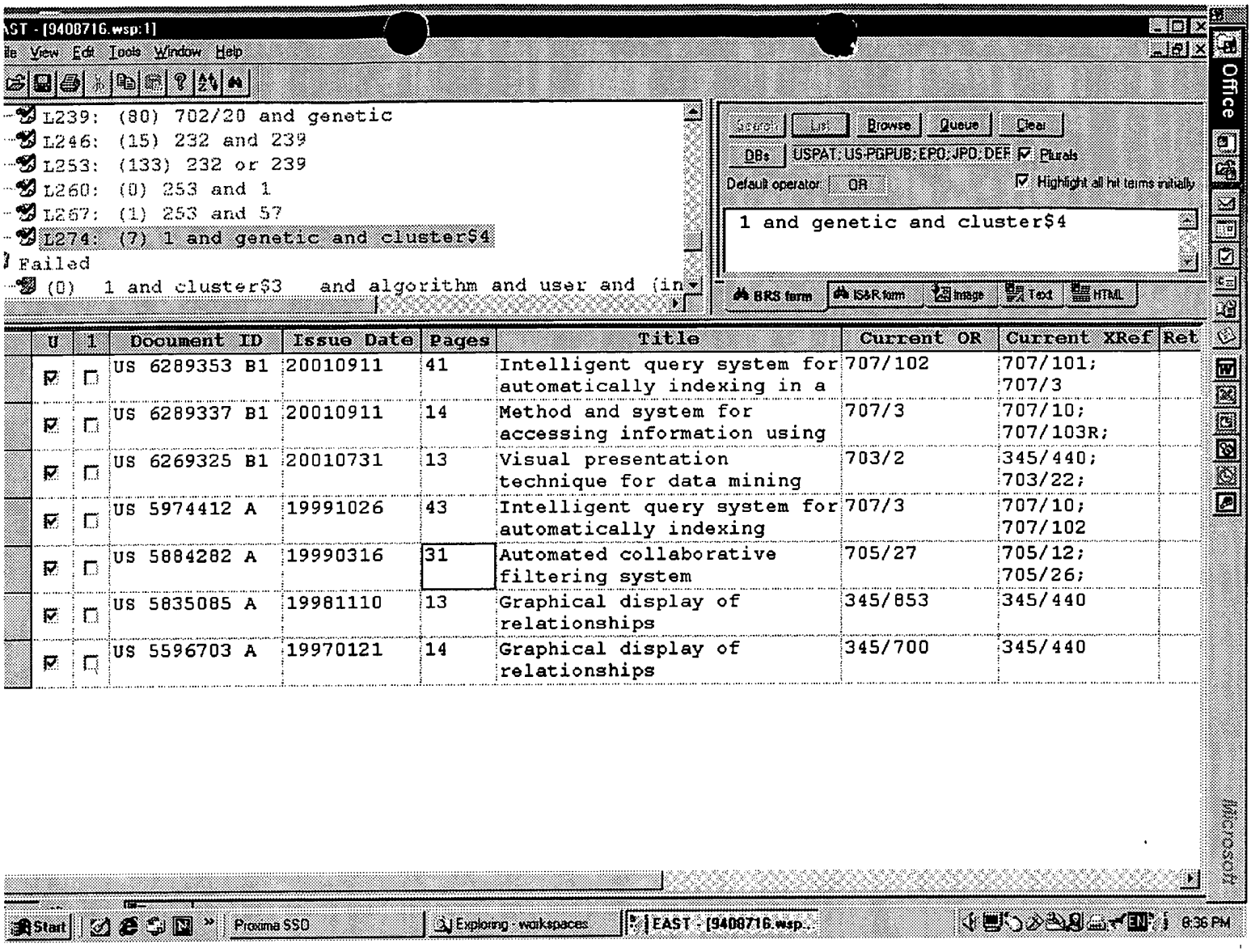

EAST - [9408716.wsp: 1]
File View Edit Tools Window Help
L542: (9) "5794178" and 1
L549: (7) "5619709" and 1
L556: (5) "5619709" and 1 and record$ and attribute$
L557: (11) "5794178" and record$ and attribute$
L558: (0) "6035057" and record$ and attribute$
L559: (20) "5619709" and record$ and attribute$
L560: (5) 557 and 559
L567: (0) 560 and protein
L574: (0) 560 and dna
L581: (0) 560 and gene
L588: (2) 560 and genetic
Failed
Saved
Search
List
Browse
Queue
Clear
DBs
USPAT; US-PGPUB; EPO; JPO; DER
Plurals
Default operator
OR
Highlight all hit terms initially
557 and 559
BRS form
IBM form
Image
Text
HTML
U
1
Document ID
Issue Date
Pages
Title
Current OR
Current XRef
Ret
1 US 6327574 B1 20011204 39 Hierarchical models of consumer attributes for 705/14 705/10; 705/26
2 US 6289353 B1 20010911 41 Intelligent query system for automatically indexing in a 707/102 707/101; 707/3
3 US 6269368 B1 20010731 20 Information retrieval using dynamic evidence combination 707/6 707/3; 707/4;
4 US 5974412 A 19991026 43 Intelligent query system for automatically indexing 707/3 707/10; 707/102
5 US 5794178 A 19980811 45 Visualization of information using graphical 704/9 345/440; 345/839;
Hits
Details
HTML
Ready


AST - [9408716.wsp:1]
File View Edit Tools Window Help
L260: (0) 253 and 1
L267: (1) 253 and 57
L274: (7) 1 and genetic and cluster$4
L281: (8) 1 and (gene or dna or protein or genetic) a
L288: (0) 1 and (gene or dna or protein or genetic) a
L295: (4) 1 and (gene or dna or protein or genetic) a
Failed
(0) 1 and cluster$3 and algorithm and user and (in
Search
List
Browse
Queue
Clear
DBs
USPAT; US-PGPUB; EPO; JPO; DER
Plurals
Default operator: OR
Highlight all hit terms initially
1 and (gene or dna or protein or genetic) and cluster$4
BRS form
IS&R form
Image
Text
HTML
D
1
Document ID
Issue Date
Pages
Title
Current OR
Current XRef
Ret
US 6301579 B1
20011009
46
Method, system, and computer program product for
707/102
345/440; 707/104.1
US 6289353 B1
20010911
41
Intelligent query system for automatically indexing in a
707/102
707/101; 707/3
US 6289337 B1
20010911
14
Method and system for accessing information using
707/3
707/10; 707/103R;
US 6269325 B1
20010731
13
Visual presentation technique for data mining
703/2
345/440; 703/22;
US 5974412 A
19991026
43
Intelligent query system for automatically indexing
707/3
707/10; 707/102
US 5884282 A
19990316
31
Automated collaborative filtering system
705/27
705/12; 705/26;
US 5835085 A
19981110
13
Graphical display of relationships
345/853
345/440
US 5596703 A
19970121
14
Graphical display of relationships
345/700
345/440
Office
Microsoft
Start
Proxima SSO
Exploring - workspaces
EAST - [9408716.wsp...
6:39 PM

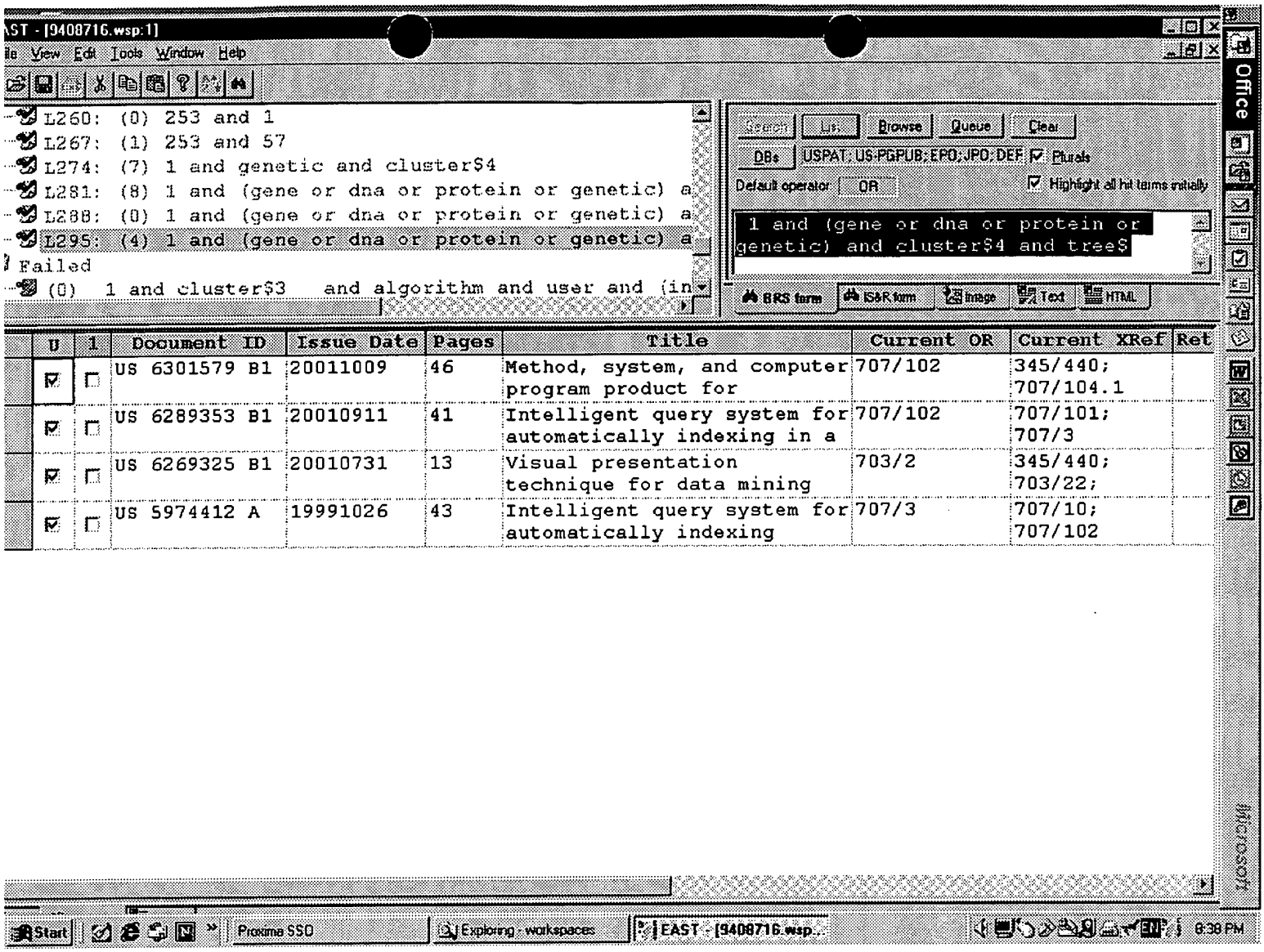

AST - [9408716.wsp:1]
File View Edit Tools Window Help
L323: (7) 57 and (gene or dna or protein or genetic)
L337: (84) cluster and 1
L344: (33) cluster and 64
L351: (426) cluster and 50
L358: (706) cluster and 57
L365: (1146) cluster and 382/$.ccls.
L372: (3) cluster and 382/$.ccls. and 351 and 358
L379: (80) 702/20 and genetic
L386: (16) 1 and genetic
L393: (0) 1 and genetic and 379
L400: (8) 1 and genetic and 345/$.ccls.
Failed
Search
Clear
Browse
Queue
Clear
DBs
USPAT; US-PGPUB; EPO; JPO; DEF
Plurals
Default operator:
OR
Highlight all hit terms initially
1 and genetic and 345/$.ccls.
BRS form
IS&R form
Image
Text
HTML
D
I
Document ID
Issue Date
Pages
Title
Current OR
Current XRef
Ret
US 6304262 B1
20011016
16
Information security analysis system
345/418
US 6269325 B1
20010731
13
Visual presentation technique for data mining
703/2
345/440; 703/22;
US 6074831 A
20000613
15
Partitioning of polymorphic DNAs
435/6
345/440; 435/91.1;
US 5835085 A
19981110
13
Graphical display of relationships
345/853
345/440
US 5596703 A
19970121
14
Graphical display of relationships
345/700
345/440
US 5586052 A
19961217
16
Rule based apparatus and method for evaluating an
703/1
345/440; 700/182;
US 5511158 A
19960423
13
System and method for creating and evolving
345/440
345/419; 345/420;
US 5510995 A
19960423
26
Sculptured surface synthesis based on functional design
700/182
345/419; 345/440
Office
Microsoft
Start
Proxima SSD
Exploring - workspaces
EAST - [9408716.wsp...
8:56 PM



	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Ret
1	☑	☐	US 6278799 B1	20010821	44	Hierarchical data matrix pattern recognition system	382/159	382/155; 382/156;	
2	☑	☐	US 6035057 A	20000307	43	Hierarchical data matrix pattern recognition and	382/159	382/155; 382/156	
3	☑	☑	US 5794178 A	19980811	45	Visualization of information using graphical	704/9	345/440; 345/839;	
4	☑	☐	US 5675819 A	19971007	29	Document information retrieval using global word	704/10	704/9; 707/3;	
5	☑	☐	US 5619709 A	19970408	45	System and method of context vector generation and	707/532	704/9; 707/2	



U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Ret
☑	☐	US 6289353 B1	20010911	41	Intelligent query system for automatically indexing in a	707/102	707/101; 707/3	
☑	☐	US 6289337 B1	20010911	14	Method and system for accessing information using	707/3	707/10; 707/103R;	
☑	☐	US 6269325 B1	20010731	13	Visual presentation technique for data mining	703/2	345/440; 703/22;	
☑	☐	US 5974412 A	19991026	43	Intelligent query system for automatically indexing	707/3	707/10; 707/102	
☑	☐	US 5884282 A	19990316	31	Automated collaborative filtering system	705/27	705/12; 705/26;	
☑	☐	US 5835085 A	19981110	13	Graphical display of relationships	345/853	345/440	
☑	☐	US 5596703 A	19970121	14	Graphical display of relationships	345/700	345/440	



U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Ret
☑	☐	US 6301579 B1	20011009	46	Method, system, and computer program product for	707/102	345/440; 707/104.1	
☑	☐	US 6289353 B1	20010911	41	Intelligent query system for automatically indexing in a	707/102	707/101; 707/3	
☑	☐	US 6269325 B1	20010731	13	Visual presentation technique for data mining	703/2	345/440; 703/22;	
☑	☐	US 5974412 A	19991026	43	Intelligent query system for automatically indexing	707/3	707/10; 707/102	

FIG. 2 shows a dendogram produced by Neighbor Joining (NJ) analysis of binary files representing the presence and absence of 1,251 amplification products from each strain produced with six different primer combinations and the method of the present invention (tree length=960, consistency index=0.74, retention index=0.83 with 168 characters). The tree is rooted with the K-12 derivative MC 1061 as an outgroup. Among the O157:H7 strains, 1,060 of the 1,252 characters were conserved. Human isolates (H) and cattle isolates (C) have been previously described (Shere et al., Appl. Environ. Microbiol. 64:1390-1399, 1998; Gouveia et al., J. Clin. Microbiol. 36:727-733, 1998).

FIG. 3 shows a dendogram produced by Neighbor Joining (NJ) analysis of binary files representing the presence and absence of 1,250 amplification products from each strain produced with six different primer combinations and the method of the present invention (tree length=1398, consistency index=0.61, retention index=0.81 with 235 characters. Among the O157:H7 strains, 892 of the 1,250 bands were conserved. The tree is rooted using the K-12 derivative MC 1061 as an outgroup. The state from which each strain originated is indicated by the two letter abbreviation in parentheses. Human isolates have an H at the end of the designation and bovine isolates are in bold.

DETAILED DESCRIPTION:

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

All publications, patents, patent applications or other references cited in this application are herein incorporated by reference in their entirety as if each individual publication, patent, patent application or reference were specifically and individually indicated to be incorporated by reference.

As used herein, the term "oligonucleotide" means a molecule consisting of at least two deoxyribonucleotides or ribonucleotides joined by phosphodiester bonds.

As used herein the term "primer" or "oligonucleotide primer" means an oligonucleotide, either naturally occurring as in a purified restriction enzyme digest or produced synthetically, that under the proper conditions, is capable

The method of the present invention has practical applications, including, but not limited to genetic mapping; determination of changes in expression patterns; the distinguishing and identification of the species, strain or serotype of organisms; and the identification of individuals?

Polymorphisms detected by the method of the present invention can be used to construct genetic linkage maps. For example, the presence or absence of amplification products obtained from samples from different organisms can be used to produce binary files. Phylogenetic relationships based on the pattern of amplification products obtained can be assessed through the maximum parsimony method and dendograms generated by Neighbor Joining (NJ) analysis (Saitou et al., Mol. Biol. Evol. 4:406-425, 1987). Thus, the present invention provides an improved method for the determination of evolutionary changes between related organisms. The present invention can also be used to identify nucleic acid segments involved in conferring pathogenicity, environmental fitness or economically important traits.

Further, the method of the present invention can be used to identify the species, strain or serotype of organisms such as bacteria. Using the method of the present invention, a data base can be constructed based on the pattern of amplification products characteristic of known species, strains or serotypes. The pattern of amplification products obtained from an unknown organism using the present invention can be compared to the patterns in the data base, thereby allowing identification of the organism.

The present invention can also be used for the identification of individuals. Using the method of the present invention, a data base can be constructed containing the pattern of amplification products of individuals. The pattern of amplification products obtained from an unknown individual using the present invention can be compared to the patterns in the data base, thereby allowing identification of the individual.

The present invention is also useful for differential display analysis for the identification of genes by their expression patterns. Using the method of the present invention, amplification products can be produced from DNA prepared by reverse transcription of RNA extracted from two groups of organisms that

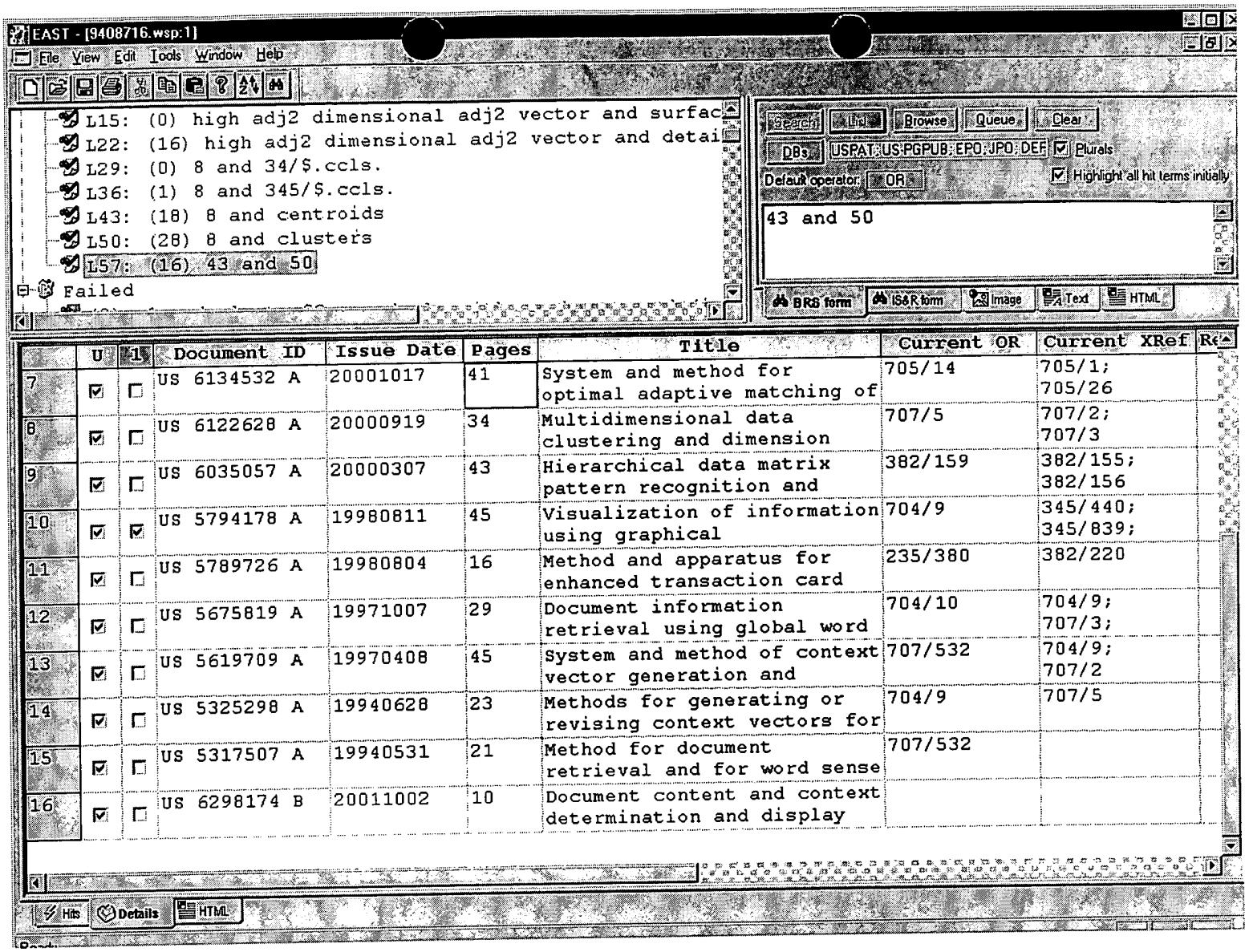
Determination of Genetic Relationships

Organisms from within a limited geographic region. Studies on a characterized strain set derived from dairy cattle and humans within a three-county region of Wisconsin were conducted. Human isolates in this set were derived from sporadic cases (FRIK 523 through FRIK 579) and an outbreak of hemorrhagic colitis at a daycare center (FRIK 583 through FRIK 856) that occurred during 1994 (Gouveia et al., J. Clin. Microbiol. 36:727-733, 1998). Cattle isolates (FRIK 920 through FRIK 1641) were derived from a 1995-1996 longitudinal study of three dairy cattle farms in this same region (Shere et al., Appl. Environ. Microbiol. 64:1390-1399, 1998).

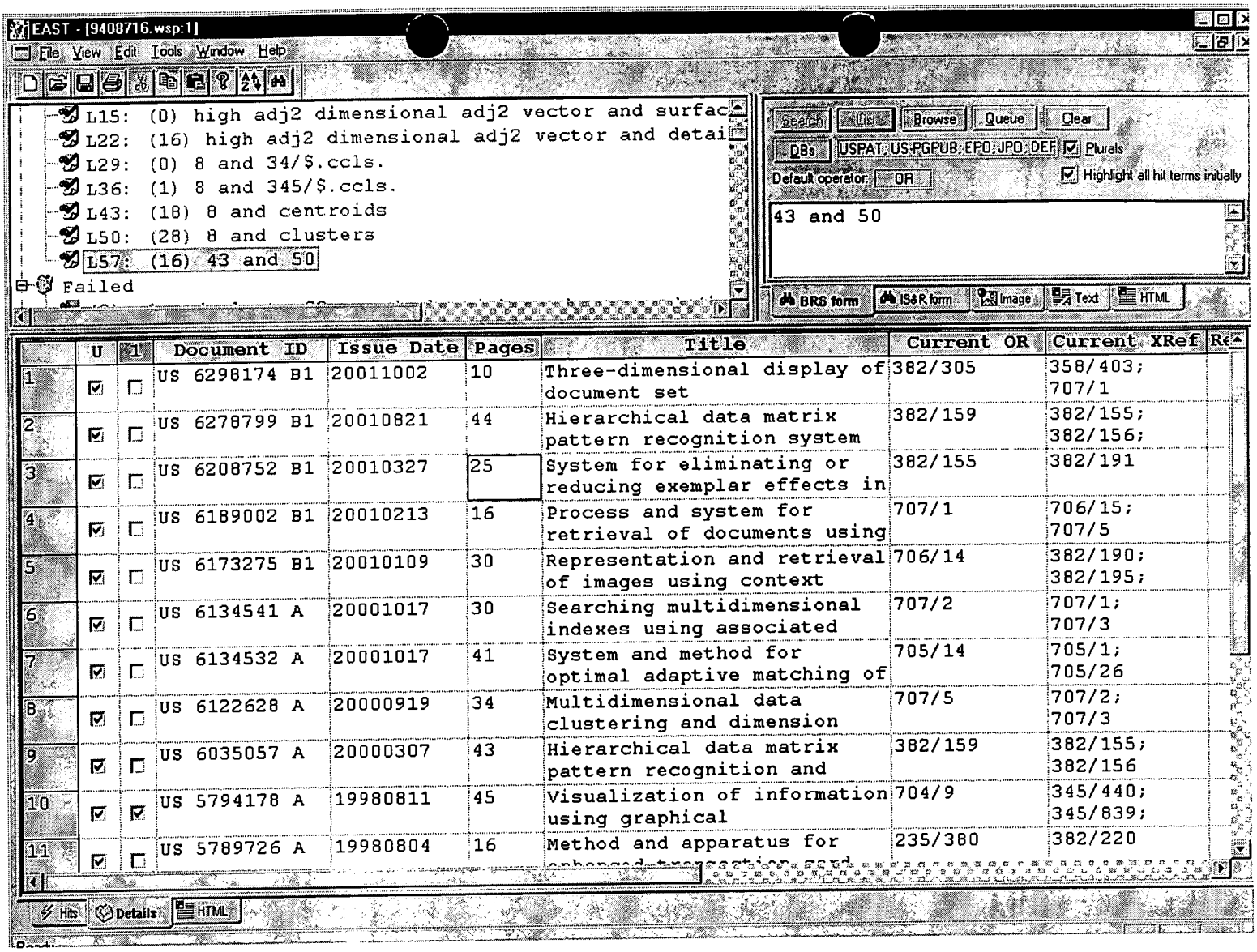
Analysis using the method of the present invention was performed on each isolate using the six different primer combinations described above. Binary files were created in Microsoft Excel 97.RTM. from printed copies of the images produced by an Alden 9315CTP photographic quality thermal printer (Alden Electronics, Inc., Westborough, Mass.). The files were generated from the presence/absence of bands (FIG. 1) between 200-1500 bases in length and binary files from each primer pair were combined head to tail in Microsoft Word 97.RTM.. Phylogenetic relationships based on the amplification products were assessed through maximum parsimony methods in PAUP V.4.0 (Swofford, PAUP version 4, Sinauer Associates, Sunderland, Mass.) and by Neighbor Joining (NJ) analysis (Saitou et al., Mol. Biol. Evol. 4:406-425, 1987), both of which yielded similar results. The E. coli K-12 strain MC1061, which is phylogenetically distant from E. coli O157:H7 was included in each analysis as an outgroup to assess the ancestral state of the characters as described (Boerlin et al., Infect. Immun. 66:2553-2561, 1998). The O157:H7 strain ATCC43895 (EDL933) was included as a standard O157:H7 strain.

Of 1,251 amplification products scored from this strain set, 191 segments were variable among the O157:H7 strains, indicating that within this limited geographic region, a considerable amount of genomic diversity can be observed by the method of the present invention. Of these variable segments, 140 were parsimony-informative.

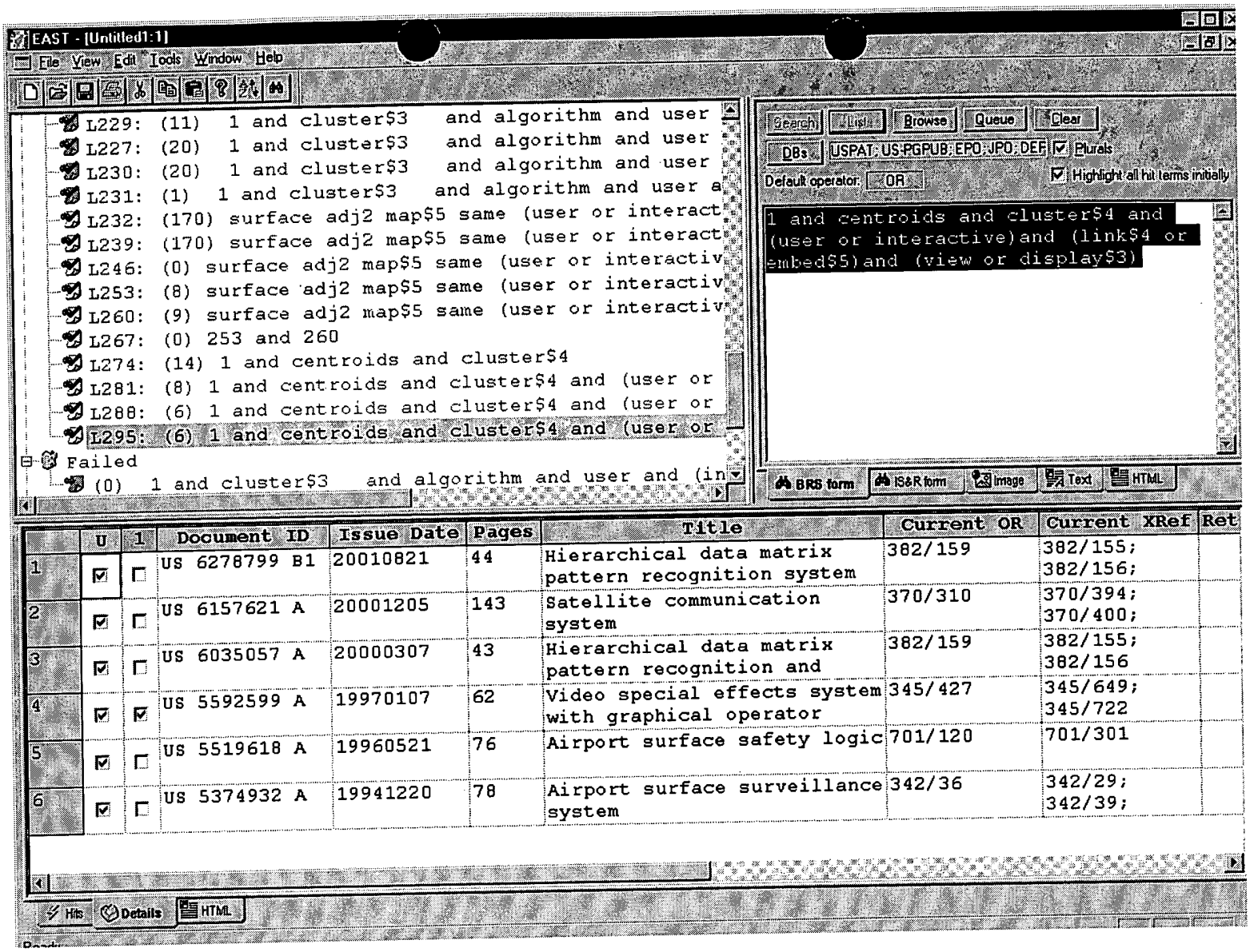
A dendogram obtained by NJ analysis (FIG. 2) demonstrated that the strains



	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	R
7	☑	☐	US 6134532 A	20001017	41	System and method for optimal adaptive matching of	705/14	705/1; 705/26	
8	☑	☐	US 6122628 A	20000919	34	Multidimensional data clustering and dimension	707/5	707/2; 707/3	
9	☑	☐	US 6035057 A	20000307	43	Hierarchical data matrix pattern recognition and	382/159	382/155; 382/156	
10	☑	☑	US 5794178 A	19980811	45	Visualization of information using graphical	704/9	345/440; 345/839;	
11	☑	☐	US 5789726 A	19980804	16	Method and apparatus for enhanced transaction card	235/380	382/220	
12	☑	☐	US 5675819 A	19971007	29	Document information retrieval using global word	704/10	704/9; 707/3;	
13	☑	☐	US 5619709 A	19970408	45	System and method of context vector generation and	707/532	704/9; 707/2	
14	☑	☐	US 5325298 A	19940628	23	Methods for generating or revising context vectors for	704/9	707/5	
15	☑	☐	US 5317507 A	19940531	21	Method for document retrieval and for word sense	707/532		
16	☑	☐	US 6298174 B	20011002	10	Document content and context determination and display			

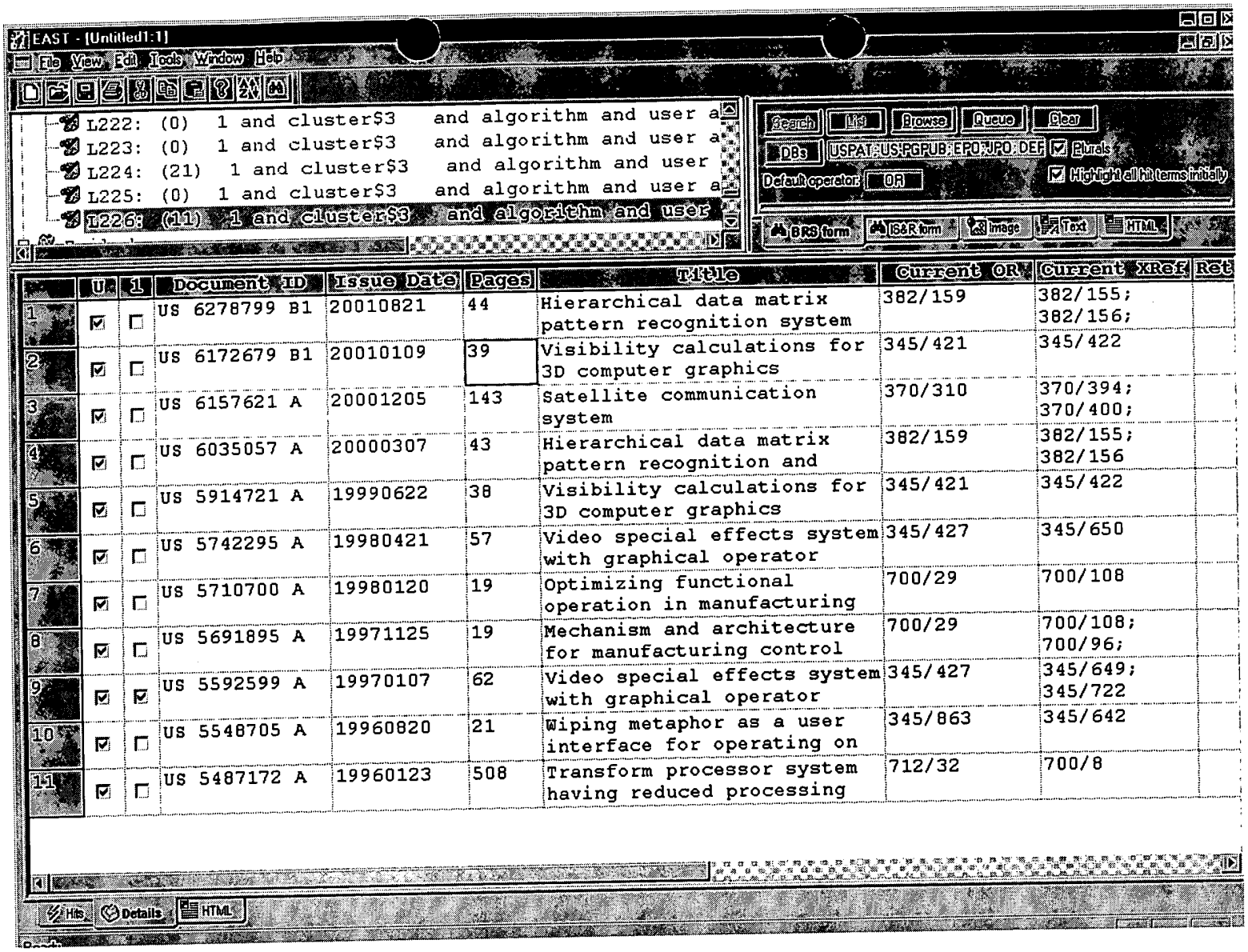


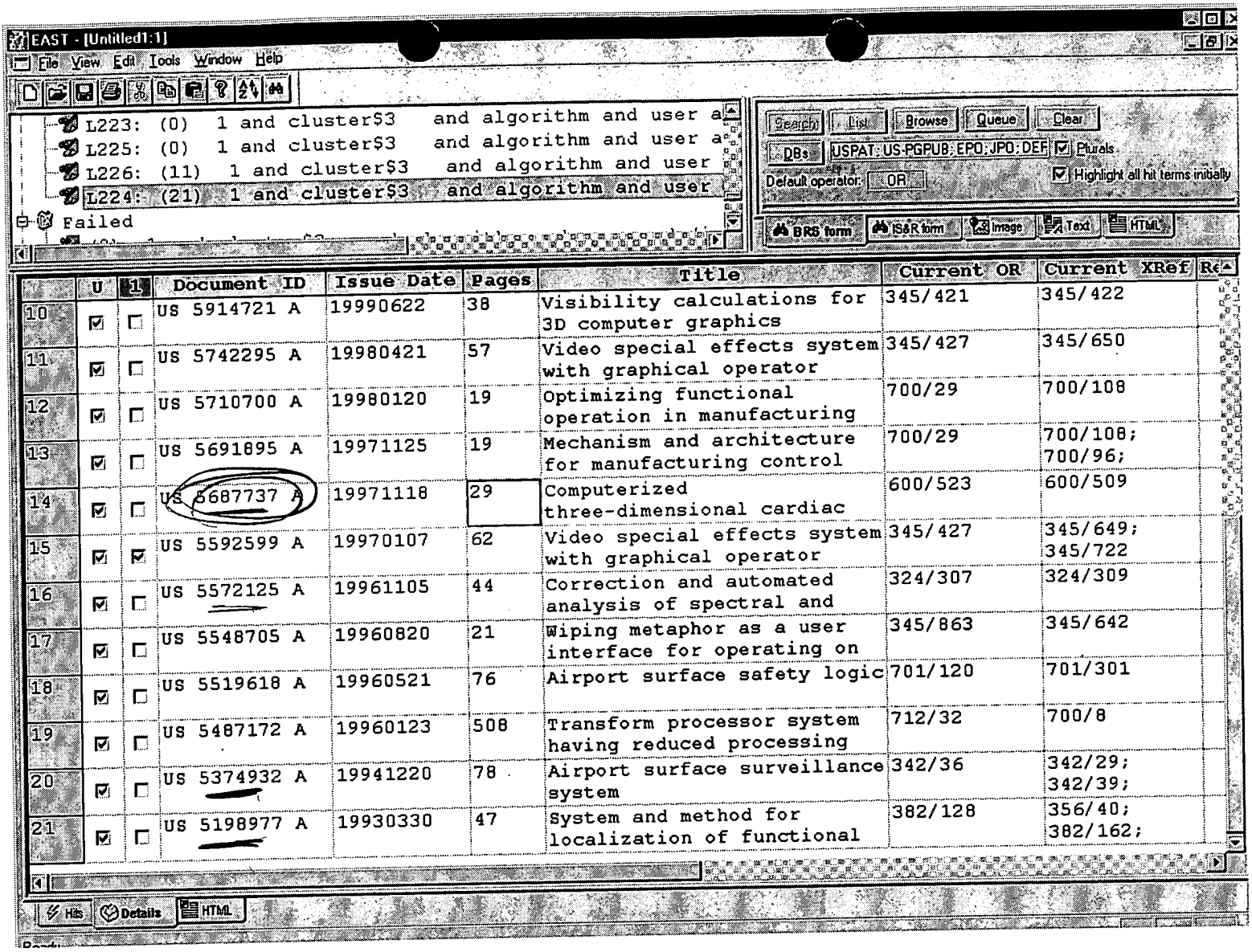
	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Re
1	☑	☐	US 6298174 B1	20011002	10	Three-dimensional display of document set	382/305	358/403; 707/1	
2	☑	☐	US 6278799 B1	20010821	44	Hierarchical data matrix pattern recognition system	382/159	382/155; 382/156;	
3	☑	☐	US 6208752 B1	20010327	25	System for eliminating or reducing exemplar effects in	382/155	382/191	
4	☑	☐	US 6189002 B1	20010213	16	Process and system for retrieval of documents using	707/1	706/15; 707/5	
5	☑	☐	US 6173275 B1	20010109	30	Representation and retrieval of images using context	706/14	382/190; 382/195;	
6	☑	☐	US 6134541 A	20001017	30	Searching multidimensional indexes using associated	707/2	707/1; 707/3	
7	☑	☐	US 6134532 A	20001017	41	System and method for optimal adaptive matching of	705/14	705/1; 705/26	
8	☑	☐	US 6122628 A	20000919	34	Multidimensional data clustering and dimension	707/5	707/2; 707/3	
9	☑	☐	US 6035057 A	20000307	43	Hierarchical data matrix pattern recognition and	382/159	382/155; 382/156	
10	☑	☑	US 5794178 A	19980811	45	Visualization of information using graphical	704/9	345/440; 345/839;	
11	☑	☐	US 5789726 A	19980804	16	Method and apparatus for	235/380	382/220	

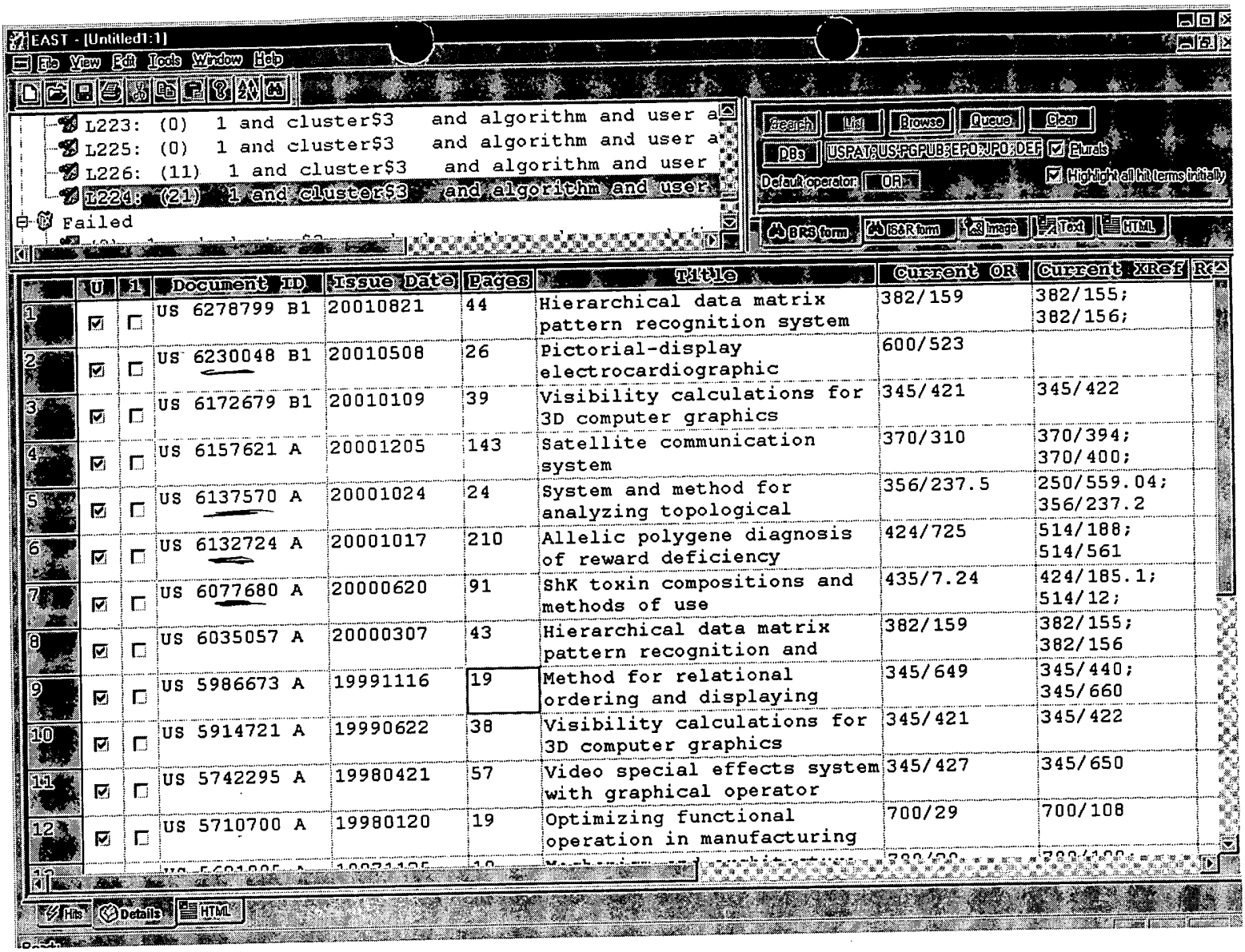


	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Ret
1	☑	☐	US 6278799 B1	20010821	44	Hierarchical data matrix pattern recognition system	382/159	382/155; 382/156;	
2	☑	☐	US 6157621 A	20001205	143	Satellite communication system	370/310	370/394; 370/400;	
3	☑	☐	US 6035057 A	20000307	43	Hierarchical data matrix pattern recognition and	382/159	382/155; 382/156	
4	☑	☑	US 5592599 A	19970107	62	Video special effects system with graphical operator	345/427	345/649; 345/722	
5	☑	☐	US 5519618 A	19960521	76	Airport surface safety logic	701/120	701/301	
6	☑	☐	US 5374932 A	19941220	78	Airport surface surveillance system	342/36	342/29; 342/39;	

Hits Details HTML


EAST - [Untitled1:1]
File View Edit Tools Window Help
L222: (0) 1 and cluster$3 and algorithm and user a
L223: (0) 1 and cluster$3 and algorithm and user a
L224: (21) 1 and cluster$3 and algorithm and user
L225: (0) 1 and cluster$3 and algorithm and user a
L226: (11) 1 and cluster$3 and algorithm and user
Search Edit Browse Queue Clear
DBs USPAT;US-PGPUB;EPO;JPO;DER Plurals
Default operator: OR
Highlight all hit terms initially
BRS form IS&R form Image Text HTML
U 1 Document ID Issue Date Pages Title Current OR Current XRef Ret
1 US 6278799 B1 20010821 44 Hierarchical data matrix pattern recognition system 382/159 382/155; 382/156;
2 US 6172679 B1 20010109 39 Visibility calculations for 3D computer graphics 345/421 345/422
3 US 6157621 A 20001205 143 Satellite communication system 370/310 370/394; 370/400;
4 US 6035057 A 20000307 43 Hierarchical data matrix pattern recognition and 382/159 382/155; 382/156
5 US 5914721 A 19990622 38 Visibility calculations for 3D computer graphics 345/421 345/422
6 US 5742295 A 19980421 57 Video special effects system with graphical operator 345/427 345/650
7 US 5710700 A 19980120 19 Optimizing functional operation in manufacturing 700/29 700/108
8 US 5691895 A 19971125 19 Mechanism and architecture for manufacturing control 700/29 700/108; 700/96;
9 US 5592599 A 19970107 62 Video special effects system with graphical operator 345/427 345/649; 345/722
10 US 5548705 A 19960820 21 Wiping metaphor as a user interface for operating on 345/863 345/642
11 US 5487172 A 19960123 508 Transform processor system having reduced processing 712/32 700/8
Hits Details HTML


EAST - [Untitled1:1]
File View Edit Tools Window Help
L223: (0) 1 and cluster$3 and algorithm and user a
L225: (0) 1 and cluster$3 and algorithm and user a
L226: (11) 1 and cluster$3 and algorithm and user
L224: (21) 1 and cluster$3 and algorithm and user
Failed
Search List Browse Queue Clear
DBs USPAT; US-PGPUB; EPO; JPO; DER Plurals
Default operator: OR
Highlight all hit terms initially
BRS form ISR form Image Text HTML
U 1 Document ID Issue Date Pages Title Current OR Current XRef
10 US 5914721 A 19990622 38 Visibility calculations for 3D computer graphics 345/421 345/422
11 US 5742295 A 19980421 57 Video special effects system with graphical operator 345/427 345/650
12 US 5710700 A 19980120 19 Optimizing functional operation in manufacturing 700/29 700/108
13 US 5691895 A 19971125 19 Mechanism and architecture for manufacturing control 700/29 700/108; 700/96;
14 US 5687737 A 19971118 29 Computerized three-dimensional cardiac 600/523 600/509
15 US 5592599 A 19970107 62 Video special effects system with graphical operator 345/427 345/649; 345/722
16 US 5572125 A 19961105 44 Correction and automated analysis of spectral and 324/307 324/309
17 US 5548705 A 19960820 21 Wiping metaphor as a user interface for operating on 345/863 345/642
18 US 5519618 A 19960521 76 Airport surface safety logic 701/120 701/301
19 US 5487172 A 19960123 508 Transform processor system having reduced processing 712/32 700/8
20 US 5374932 A 19941220 78 Airport surface surveillance system 342/36 342/29; 342/39;
21 US 5198977 A 19930330 47 System and method for localization of functional 382/128 356/40; 382/162;
Hits Details HTML


EAST - [Untitled1:1]
File View Edit Tools Window Help
L223: (0) 1 and cluster$3 and algorithm and user a
L225: (0) 1 and cluster$3 and algorithm and user a
L226: (11) 1 and cluster$3 and algorithm and user
L224: (21) 1 and cluster$3 and algorithm and user
Failed
Search List Browse Queue Clear
DBs USPAT;US-PGPUB;EPO;JPO;DER
Plurals
Default operator: OR
Highlight all hit terms initially
BRS form IS&R form Image Text HTML
U I Document ID Issue Date Pages Title Current OR Current XRef R
1 US 6278799 B1 20010821 44 Hierarchical data matrix pattern recognition system 382/159 382/155; 382/156;
2 US 6230048 B1 20010508 26 Pictorial-display electrocardiographic 600/523
3 US 6172679 B1 20010109 39 Visibility calculations for 3D computer graphics 345/421 345/422
4 US 6157621 A 20001205 143 Satellite communication system 370/310 370/394; 370/400;
5 US 6137570 A 20001024 24 System and method for analyzing topological 356/237.5 250/559.04; 356/237.2
6 US 6132724 A 20001017 210 Allelic polygene diagnosis of reward deficiency 424/725 514/188; 514/561
7 US 6077680 A 20000620 91 ShK toxin compositions and methods of use 435/7.24 424/185.1; 514/12;
8 US 6035057 A 20000307 43 Hierarchical data matrix pattern recognition and 382/159 382/155; 382/156
9 US 5986673 A 19991116 19 Method for relational ordering and displaying 345/649 345/440; 345/660
10 US 5914721 A 19990622 38 Visibility calculations for 3D computer graphics 345/421 345/422
11 US 5742295 A 19980421 57 Video special effects system with graphical operator 345/427 345/650
12 US 5710700 A 19980120 19 Optimizing functional operation in manufacturing 700/29 700/108
Hits Details HTML

DEPR:
The steps to generate a single 3D surface contour map display are the same regardless of whether the display is for a static or interval map (described below), or for one frame of a dynamic (moving) display. There are differences, however, depending on whether a flat-shaded map with distinct contour boundaries or a gouraud-shaded map with gradually changing contour colors (discussed below) is produced.

DEPR:
For activation time maps, a step can be used to detect sharp discontinuities between early and late times, to avoid displaying all possible contours at such discontinuities. It may help to visualize this by thinking of there being an abrupt cliff where elevation changes sharply from a high altitude to a low one. In a topological map it may be appropriate to draw many closely spaced contour lines to represent the elevation change. For an activation time map, however, where an activation wave front contour exists, there are no intermediate times (contours) between that contour edge and the repolarized, high -time value color area it is advancing over. Thus, no intermediate contours should be drawn between the triangle vertex for an area just activated and the other vertices of that triangle which are not yet activated. This discontinuity problem is only present for activation time static maps or time-since-last activation dynamic maps; for potential distribution maps, which are analogous to topological maps, discontinuities do not exist.

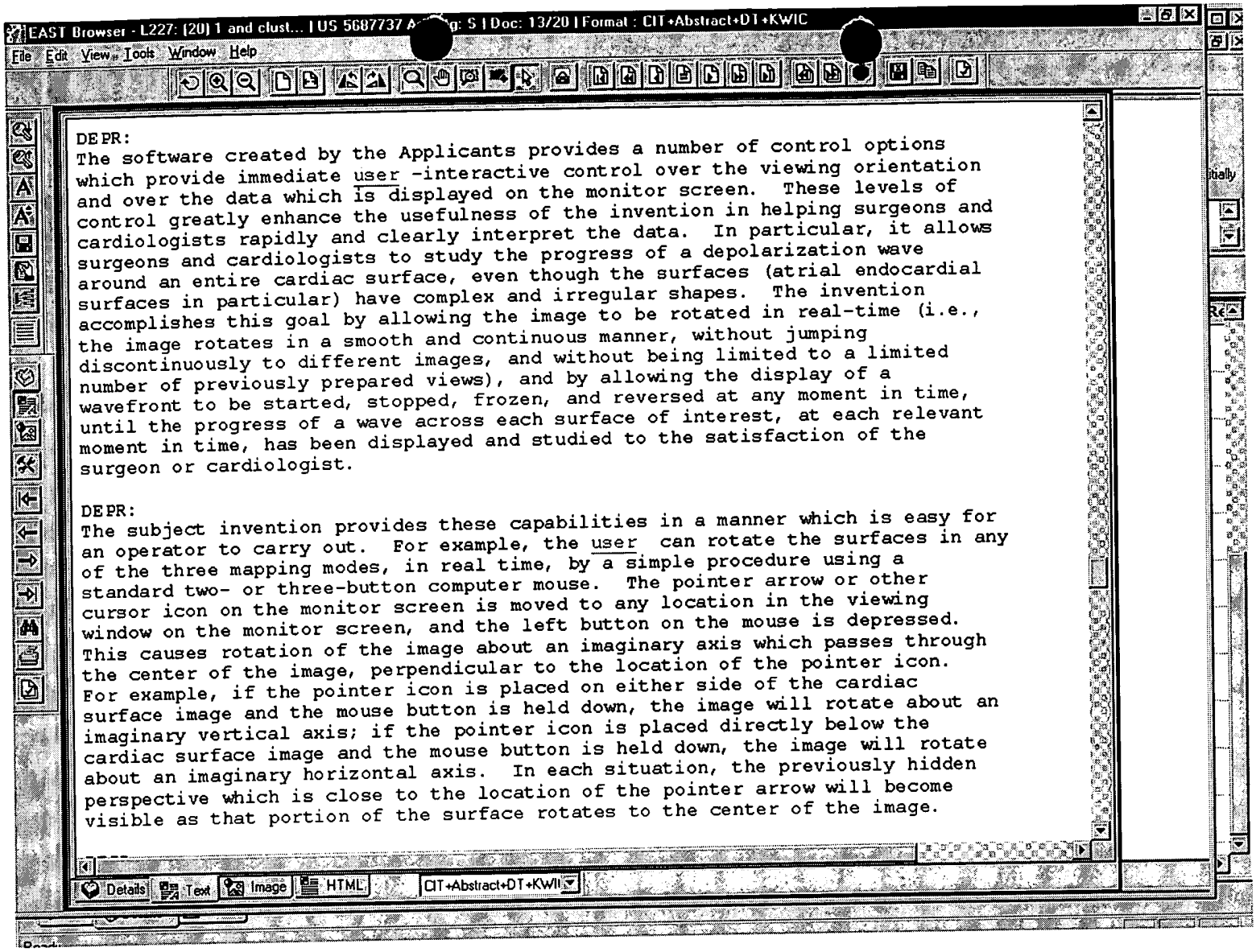
DEPR:
(2) Gouraud-shaded maps. If Gouraud shading is used (Gouraud 1971), the color hues can vary across a single planar facet if the numerical values at the vertex points around the periphery of the facets fall into different color assignment ranges. Gouraud shading effectively interpolates the values across the surface of a facet and displays a smooth continuum of colors accordingly. Due to this type of shading across a single facet, there are no abrupt color discontinuities. The Silicon Graphics GTX workstation is able to perform Gouraud shading calculations using algorithms embedded in integrated circuits, without requiring additional software to be read or used, and the processing is very rapid; a Gouraud shaded surface model having thousands of facets can be

Gouraud shading can be shown in the flat-shading method at about 6 frames per second, which is adequate for most purposes, and this algorithm can be embedded in the hardware for faster displays if desired.

DEPR:
The static maps and interval maps described above can be rotated on the computer screen and viewed from any angle. This is an exceptionally important feature of the subject invention. Most of the prior art cardiac mapping systems only provide two-dimensional maps which cannot adequately display the data in a manner that can be quickly interpreted and understood by a surgeon or cardiologist who does not specialize in interpreting computerized. The benefits of three-dimensional mapping over two-dimensional mapping are discussed in more detail below.

DEPR:
Activation time maps (ATM's) are generated as follows. The data from each electrode are analyzed to determine the activation time at each electrode; as described above, this determination will depend on whether the electrodes are unipolar or bipolar (bipolar electrodes usually measure peak voltages, while unipolar electrodes usually measure the rate of change, dv/dt). The activation times in the various channels are used to construct a two-dimensional numerical matrix, with a row for each channel (electrode), and a number of columns equal to the number of milliseconds in the period being analyzed. A highly simplified example of an ATM array is provided in Table 1, to indicate how the data are arranged. For each channel, successive column values are set to the scale maximum, until the column corresponding to the first activation time in that channel is reached. The value in the column for that time is set to zero. Thereafter, the value in each successive column is incremented by one millisecond until the next activation time is reached. The column value is set to zero again, and the process is repeated for each activation in the channel.

DEPR:
For each channel, the resulting numerical matrix contains the time-since-last-activation at each millisecond. These arrays can then be displayed dynamically on the 3D surface model by assigning each vertex on the 3D model to the value of its nearest electrode at each point in time. The


EAST Browser - L227: (20) 1 and clust... | US 5687737 A... g: S | Doc: 13/20 | Format : CIT+Abstract+DT+KWIC
File Edit View Tools Window Help
DEPR:
The software created by the Applicants provides a number of control options which provide immediate user -interactive control over the viewing orientation and over the data which is displayed on the monitor screen. These levels of control greatly enhance the usefulness of the invention in helping surgeons and cardiologists rapidly and clearly interpret the data. In particular, it allows surgeons and cardiologists to study the progress of a depolarization wave around an entire cardiac surface, even though the surfaces (atrial endocardial surfaces in particular) have complex and irregular shapes. The invention accomplishes this goal by allowing the image to be rotated in real-time (i.e., the image rotates in a smooth and continuous manner, without jumping discontinuously to different images, and without being limited to a limited number of previously prepared views), and by allowing the display of a wavefront to be started, stopped, frozen, and reversed at any moment in time, until the progress of a wave across each surface of interest, at each relevant moment in time, has been displayed and studied to the satisfaction of the surgeon or cardiologist.
DEPR:
The subject invention provides these capabilities in a manner which is easy for an operator to carry out. For example, the user can rotate the surfaces in any of the three mapping modes, in real time, by a simple procedure using a standard two- or three-button computer mouse. The pointer arrow or other cursor icon on the monitor screen is moved to any location in the viewing window on the monitor screen, and the left button on the mouse is depressed. This causes rotation of the image about an imaginary axis which passes through the center of the image, perpendicular to the location of the pointer icon. For example, if the pointer icon is placed on either side of the cardiac surface image and the mouse button is held down, the image will rotate about an imaginary vertical axis; if the pointer icon is placed directly below the cardiac surface image and the mouse button is held down, the image will rotate about an imaginary horizontal axis. In each situation, the previously hidden perspective which is close to the location of the pointer arrow will become visible as that portion of the surface rotates to the center of the image.
Details Text Image HTML CIT+Abstract+DT+KWIC

EAST - [Untitled1:1]

File View Edit Tools Window Help

L288: (6) 1 and centroids and cluster$4 and (user or

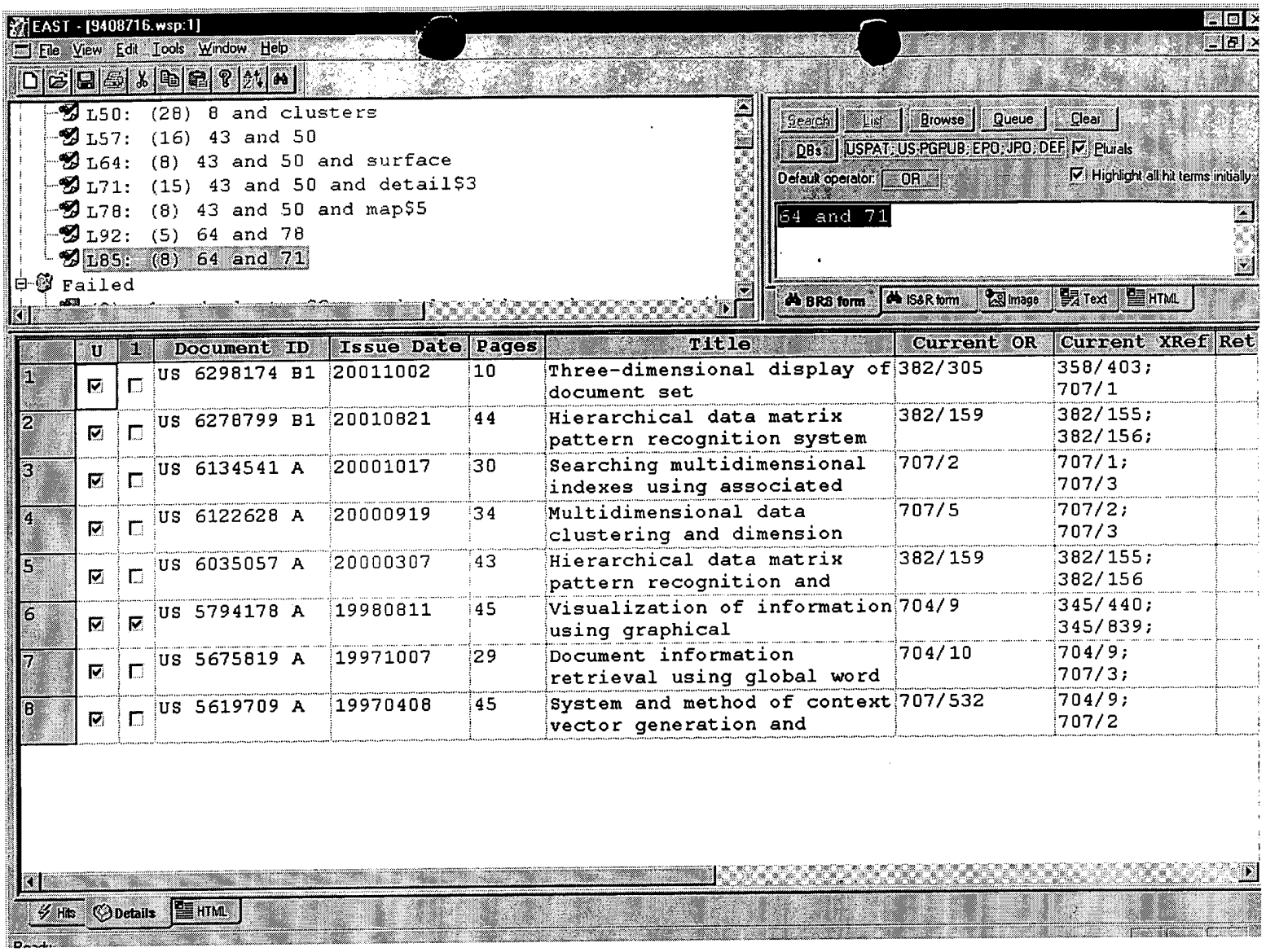
L295: (6) 1 and centroids and cluster$4 and (user or

Search | List | Browse | Queue | Clear

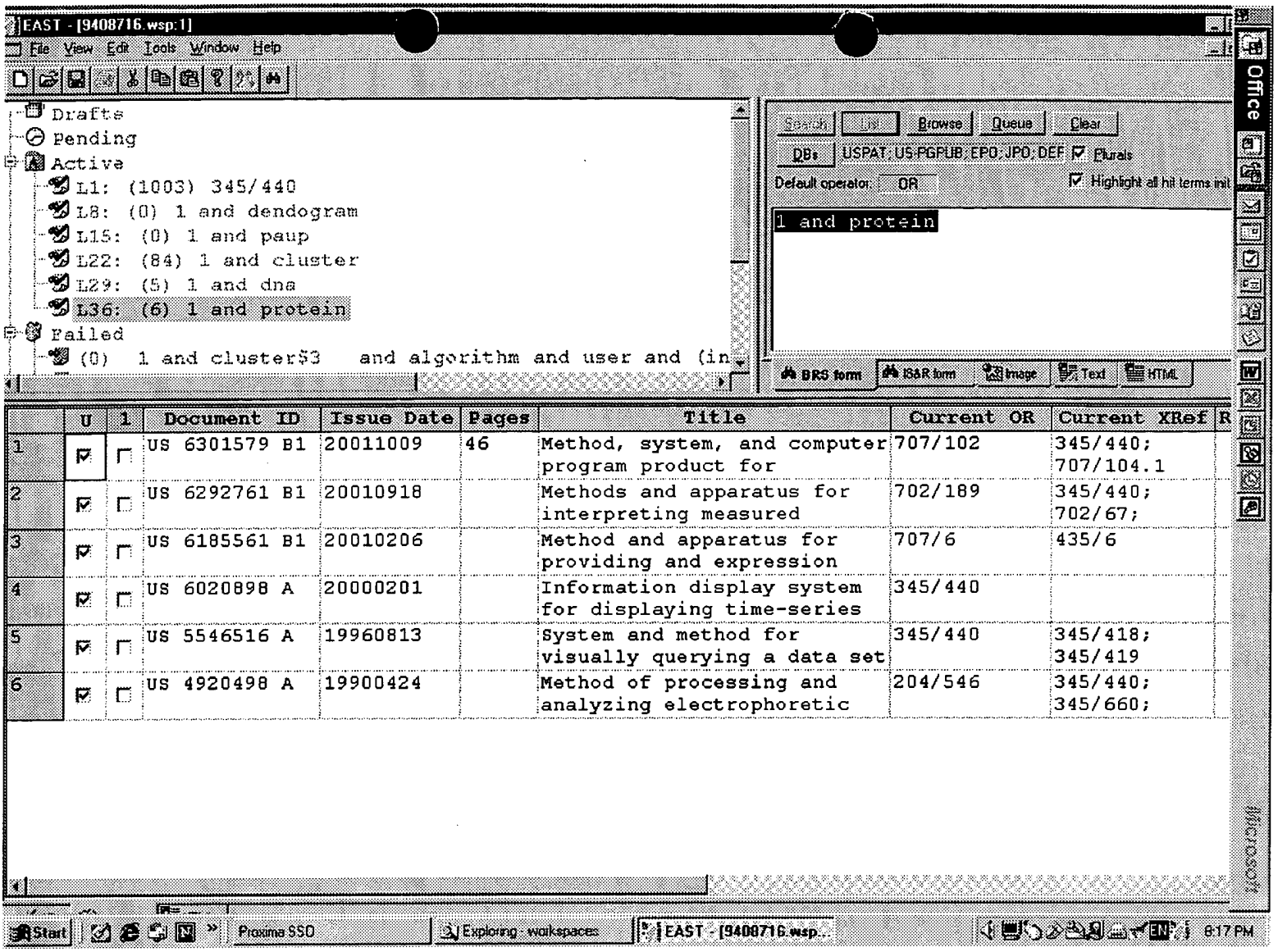
BRS form | ISR form | Image | Text | HTML

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	R
1	☑	☐	US 6230048 B1	20010508	26	Pictorial-display electrocardiographic	600/523		
2	☑	☐	US 6172679 B1	20010109	39	Visibility calculations for 3D computer graphics	345/421	345/422	
3	☑	☐	US 6031548 A	20000229	22	Progressive multi-level transmission and display of	345/440		
4	☑	☐	US 6028608 A	20000222	66	System and method of perception-based image	345/619		
5	☑	☐	US 6008820 A	19991228	71	Processor for controlling the display of rendered	345/502		
6	☑	☐	US 5914721 A	19990622	38	Visibility calculations for 3D computer graphics	345/421	345/422	
7	☑	☐	US 5867166 A	19990202	86	Method and system for generating images using	345/419	345/473; 345/629;	
8	☑	☐	US 5865832 A	19990202	22	System for detecting, measuring and compensating	606/10	351/209; 606/13;	
9	☑	☐	US 5742295 A	19980421	57	Video special effects system with graphical operator	345/427	345/650	
10	☑	☐	US 5735283 A	19980407	17	Surgical keratometer system for measuring surface	600/558	351/211; 351/212	
11	☑	☑	US 5687737 A	19971118	29	Computerized three-dimensional cardiac	600/523	600/509	
12	☑	☑	US 5592599 A	19970107	62	Video special effects system with graphical operator	345/427	345/649; 345/722	
13	☑	☐	US 5519618 A	19960521	76	Airport surface safety logic	701/120	701/301	
14	☑	☐	US 5374932 A	19941220	78	Airport surface surveillance system	342/36	342/29; 342/39;	

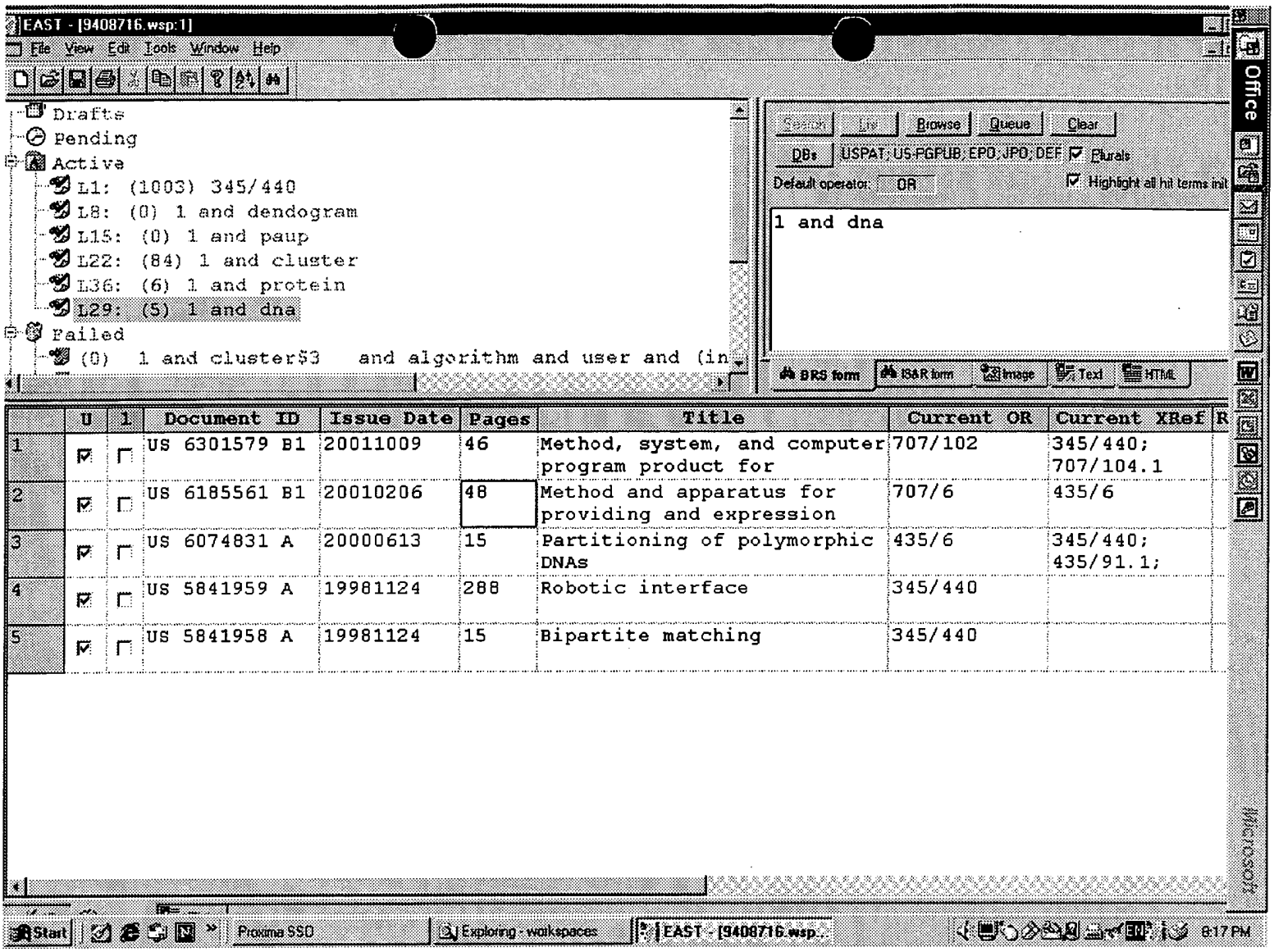
Hits | Details | HTML



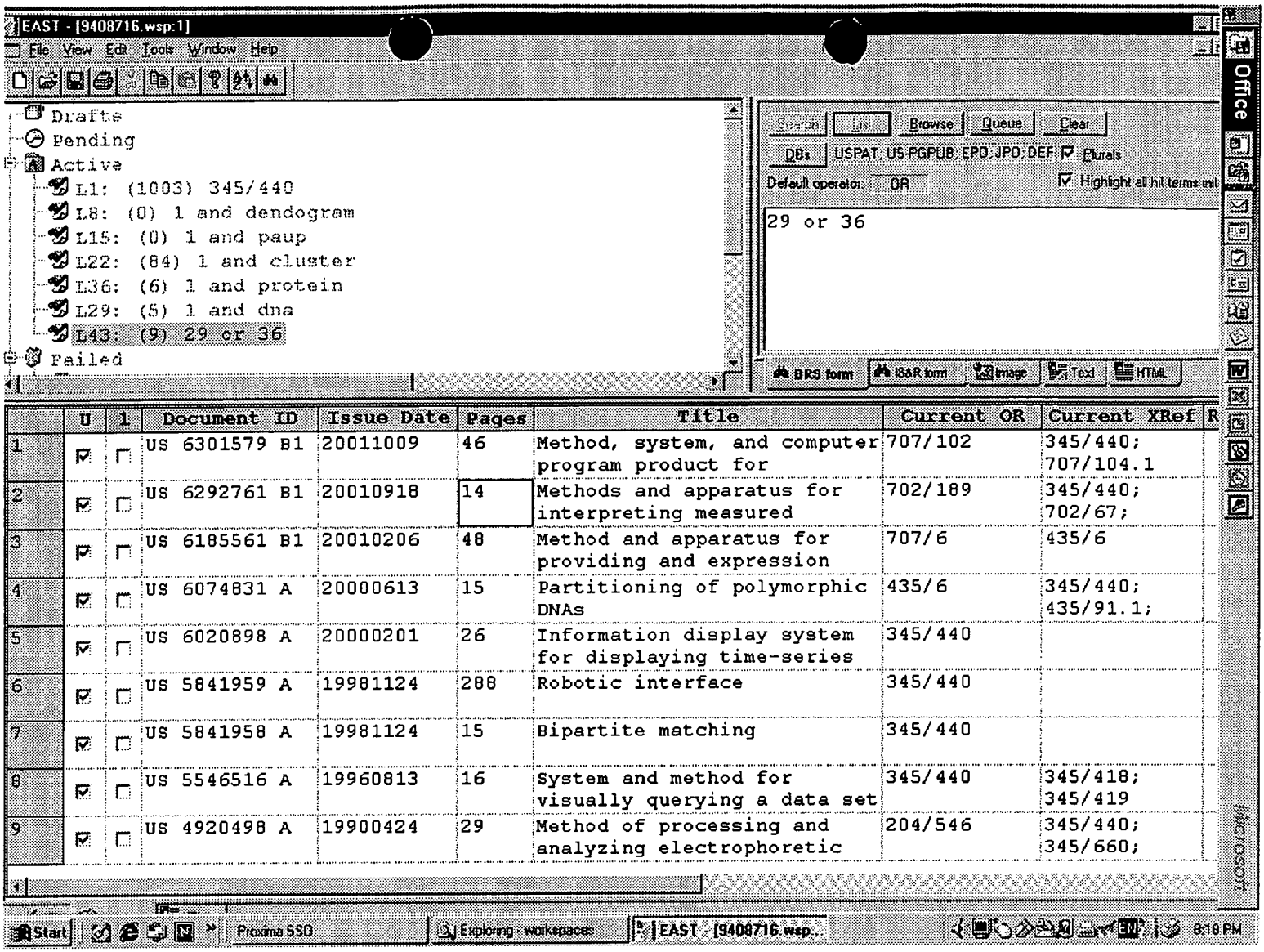
	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Ret
1	☑	☐	US 6298174 B1	20011002	10	Three-dimensional display of document set	382/305	358/403; 707/1	
2	☑	☐	US 6278799 B1	20010821	44	Hierarchical data matrix pattern recognition system	382/159	382/155; 382/156;	
3	☑	☐	US 6134541 A	20001017	30	Searching multidimensional indexes using associated	707/2	707/1; 707/3	
4	☑	☐	US 6122628 A	20000919	34	Multidimensional data clustering and dimension	707/5	707/2; 707/3	
5	☑	☐	US 6035057 A	20000307	43	Hierarchical data matrix pattern recognition and	382/159	382/155; 382/156	
6	☑	☑	US 5794178 A	19980811	45	Visualization of information using graphical	704/9	345/440; 345/839;	
7	☑	☐	US 5675819 A	19971007	29	Document information retrieval using global word	704/10	704/9; 707/3;	
8	☑	☐	US 5619709 A	19970408	45	System and method of context vector generation and	707/532	704/9; 707/2	



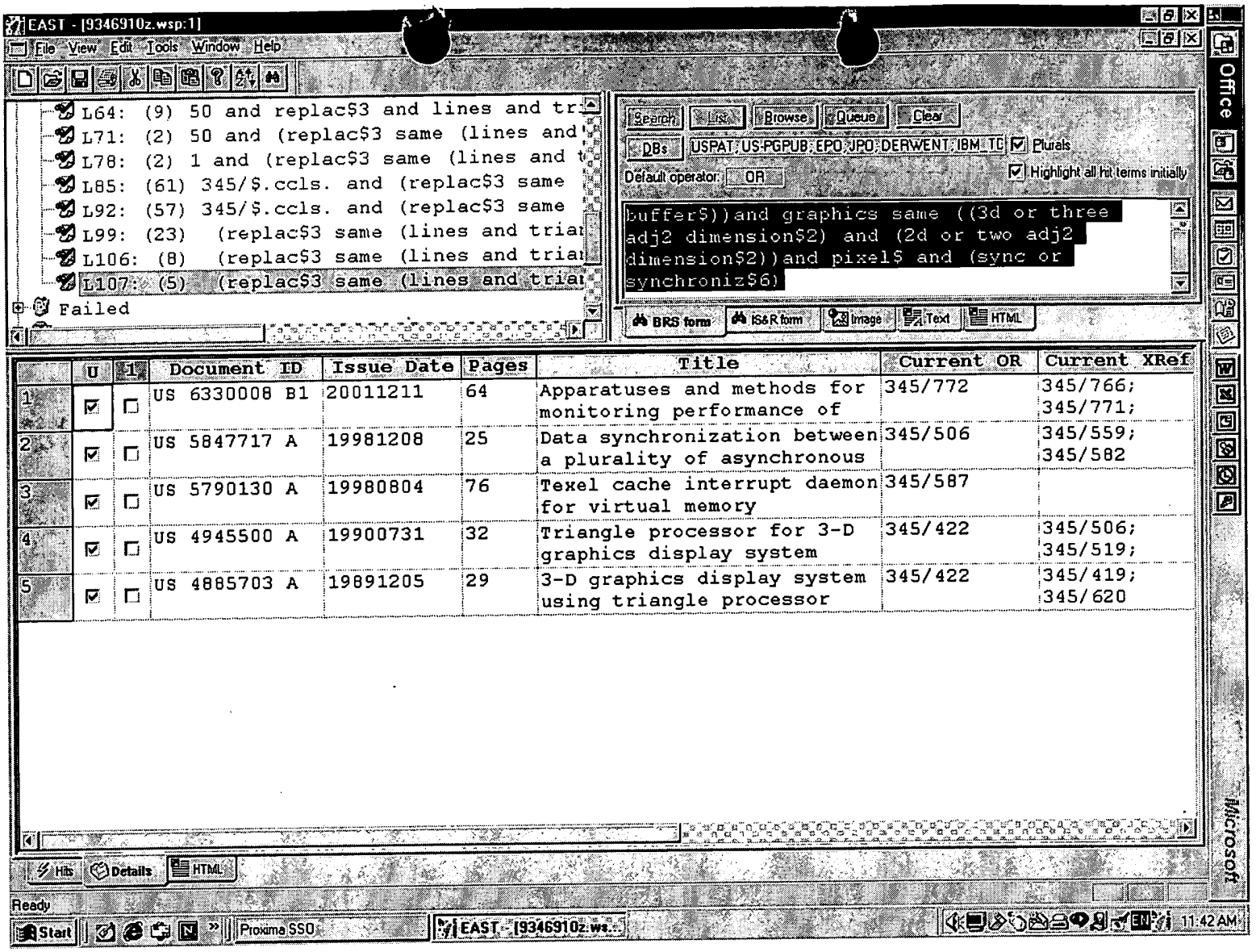
	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	R
1	☑	☐	US 6301579 B1	20011009	46	Method, system, and computer program product for	707/102	345/440; 707/104.1	
2	☑	☐	US 6292761 B1	20010918		Methods and apparatus for interpreting measured	702/189	345/440; 702/67;	
3	☑	☐	US 6185561 B1	20010206		Method and apparatus for providing and expression	707/6	435/6	
4	☑	☐	US 6020898 A	20000201		Information display system for displaying time-series	345/440		
5	☑	☐	US 5546516 A	19960813		System and method for visually querying a data set	345/440	345/418; 345/419	
6	☑	☐	US 4920498 A	19900424		Method of processing and analyzing electrophoretic	204/546	345/440; 345/660;	



	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	R
1	☑	☐	US 6301579 B1	20011009	46	Method, system, and computer program product for	707/102	345/440; 707/104.1	
2	☑	☐	US 6185561 B1	20010206	48	Method and apparatus for providing and expression	707/6	435/6	
3	☑	☐	US 6074831 A	20000613	15	Partitioning of polymorphic DNAs	435/6	345/440; 435/91.1;	
4	☑	☐	US 5841959 A	19981124	288	Robotic interface	345/440		
5	☑	☐	US 5841958 A	19981124	15	Bipartite matching	345/440		



	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	R
1	☑	☐	US 6301579 B1	20011009	46	Method, system, and computer program product for	707/102	345/440; 707/104.1	
2	☑	☐	US 6292761 B1	20010918	14	Methods and apparatus for interpreting measured	702/189	345/440; 702/67;	
3	☑	☐	US 6185561 B1	20010206	48	Method and apparatus for providing and expression	707/6	435/6	
4	☑	☐	US 6074831 A	20000613	15	Partitioning of polymorphic DNAs	435/6	345/440; 435/91.1;	
5	☑	☐	US 6020898 A	20000201	26	Information display system for displaying time-series	345/440		
6	☑	☐	US 5841959 A	19981124	288	Robotic interface	345/440		
7	☑	☐	US 5841958 A	19981124	15	Bipartite matching	345/440		
8	☑	☐	US 5546516 A	19960813	16	System and method for visually querying a data set	345/440	345/418; 345/419	
9	☑	☐	US 4920498 A	19900424	29	Method of processing and analyzing electrophoretic	204/546	345/440; 345/660;	



	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1	☑	☐	US 6330008 B1	20011211	64	Apparatuses and methods for monitoring performance of	345/772	345/766; 345/771;
2	☑	☐	US 5847717 A	19981208	25	Data synchronization between a plurality of asynchronous	345/506	345/559; 345/582
3	☑	☐	US 5790130 A	19980804	76	Texel cache interrupt daemon for virtual memory	345/587	
4	☑	☐	US 4945500 A	19900731	32	Triangle processor for 3-D graphics display system	345/422	345/506; 345/519;
5	☑	☐	US 4885703 A	19891205	29	3-D graphics display system using triangle processor	345/422	345/419; 345/620

EAST Browser - L17: (3) display#3 sa... | US 6263287 B1 | Tag: S | Doc: 2/3 | Format : KWIC

File Edit View Tools Window Help

Brief Summary Text - BSTX (4):

While such clustering analysis and reverse engineering systems are useful, it is desirable to have available a general and flexible system for the visualization, manipulation, and analysis of gene expression data. Such a system preferably includes a graphical user interface for browsing and navigating through the expression data, allowing a user to selectively view and highlight the genes of interest. The system also preferably includes sort and search functions and is preferably available for general users with PC, Mac or Unix workstations. Also preferably included in the system are clustering algorithms that are qualitatively more efficient than existing ones. The accuracy of such algorithms is preferably hierarchically adjustable so that the level of detail of clustering can be systematically refined as desired.

Brief Summary Text - BSTX (5):

A preferred algorithm for such a system is a clustering algorithm for, e.g., identifying functionally related genes with different time curves. In particular, the clustering algorithm may be used for clustering genes whose functional correlation involves a scale change, a time delay, a vertical flip or any combination of the three. The system

U.S. Patent Jul. 17, 2001 Sheet 20 of 30 US 6,263,287 B1

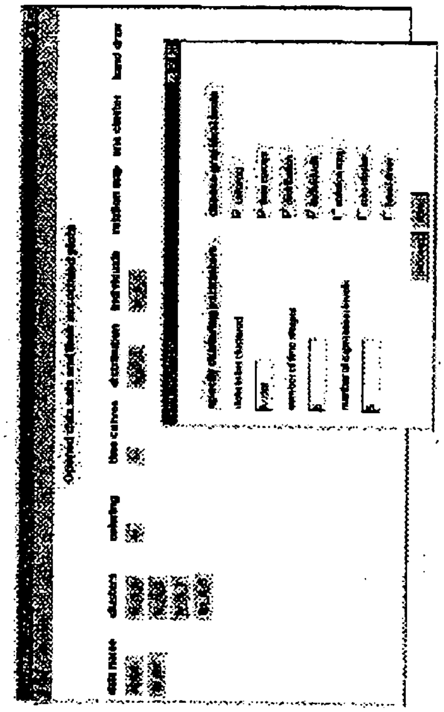


Figure 20

Detx 64+65

Brief Summary Text - BSTX (5):

A preferred algorithm for such a system is a clustering algorithm for, e.g., identifying functionally related genes with different time curves. In particular, the clustering algorithm may be used for clustering genes whose functional correlation involves a scale change, a time delay, a vertical flip or any combination of the three. The system preferably also includes a time-curve representation that is both literal and numerical. Literal representations assist in making SQL (Standard Query Language) type database queries. Numerical representations assist in allowing for the arithmetical transformation of curves. Such transformations are useful in differentiating tissue and disease specificity of gene expression. In addition, clustering algorithms and mathematical calculations preferably are tightly integrated with a graphical user presentation interface. Finally, graphics preferably are included to assist in navigation and analysis of the expression data in an intuitive, interactive, and iterative fashion.

Brief Summary Text - BSTX (6):

Indeed, there is a need for improved computer-aided techniques for the analysis and manipulation of gene expression data. The

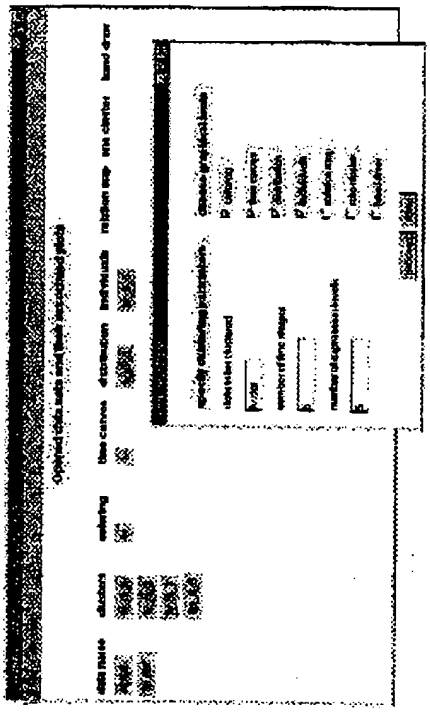


Figure 20

EAST Browser - L17: (3) display#3 sa... | US 6263287 B1 | Tag: S | Doc: 2/3 | Format : KWIC

File Edit View Tools Window Help

Brief Summary Text - BSTX (8):

The present invention relates to systems for manipulating and analyzing gene expression data. In one embodiment, the system comprises a means for receiving gene expression data for a plurality of genes; a means for comparing the gene expression data from each of said plurality of genes to a common reference frame; a means for assigning a grid representation to each of said gene expression data from said plurality of genes; and a means for presenting said assigned grid representation. More specifically, this system further comprises means for clustering said grid representations. Still further, the grid representation may be normalized to within [-1, 1]. The gene expression data for each of said plurality of genes comprises a plurality of expression levels and a plurality of associated time points.

Brief Summary Text - BSTX (9):

Clustering preferably may be grid clustering or .sigma.-.tau. clustering . The presentation step of the methods and systems of the invention preferably comprises one or more of the following for each grid representation or cluster thereof: temporal pattern of expression; file designation; gene identification number; major class; sub class; gene

Index, table, file

U.S. Patent Jul. 17, 2001 Sheet 20 of 28 US 6,263,287 B1

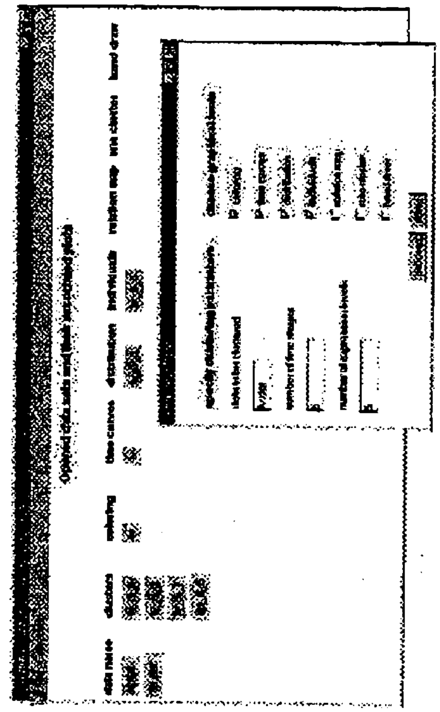


Figure 20

EAST Browser - [17: [3] display 3 of... [US 6263287 B1 ...g: 5 | Doc. 2/3 | Format: KWIC

File Edit View Tools Window Help

Brief Summary Text - BSTX (9):

Clustering preferably may be grid clustering or .sigma.-.tau. clustering . The presentation step of the methods and systems of the invention preferably comprises one or more of the following for each grid representation or cluster thereof: temporal pattern of expression; file designation; gene identification number; major class; sub class; gene description; grid representation; and time curve. This data may then be hyperlinked within said display. Further, clustered grid representations may be compared, for example, based on tissue origin or gene. The clusters themselves may be created based on, for example, gene or tissue origin.

Brief Summary Text - BSTX (10):

Another embodiment of the present invention relates to a method, in a computer system, of manipulating expression data associated with a gene, comprising the steps of: inputting expression data for a plurality of genes; comparing the expression data from said plurality of genes to a common reference frame; and assigning a grid representation to said expression data based on said comparing step. Based on its assigned grid representation, the expression data may be clustered and presented by relative

U.S. Patent Jul. 17, 2001 Sheet 20 of 20 US 6,263,287 B1

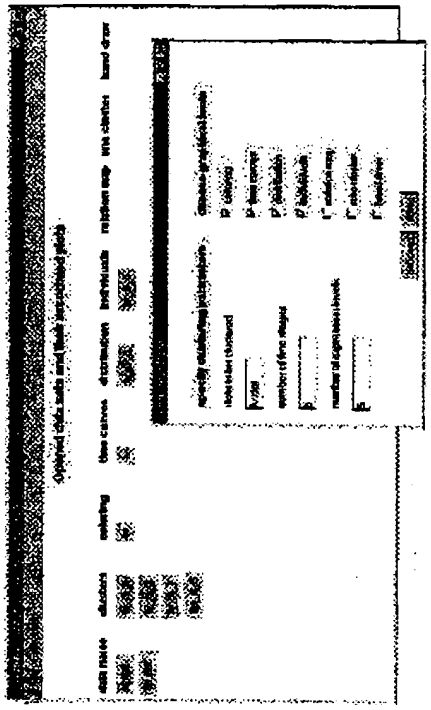


Figure 20

(1) Selection process & Index/File

(2) Analyzing etc. — hyperlinked.

Brief Summary Text - BSTX (10):

Another embodiment of the present invention relates to a method, in a computer system, of manipulating expression data associated with a gene, comprising the steps of: inputting expression data for a plurality of genes; comparing the expression data from said plurality of genes to a common reference frame; and assigning a grid representation to said expression data based on said comparing step. Based on its assigned grid representation, the expression data may be clustered and presented by relative expression levels. The clustering may also be presented by time stage, or by both relative expression level and time stage. The grid representation preferably comprises a relative expression level component and a time stage component. The relative expression level may preferably comprise three, five, seven, nine, eleven, thirteen, or fifteen relative expression levels. The time stage may preferably comprise two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen, or fifteen time stages. Clustered expression data may be sorted by relative expression level, time stage, or by both relative expression level and time stage.

Brief Summary Text - BSTX (11):

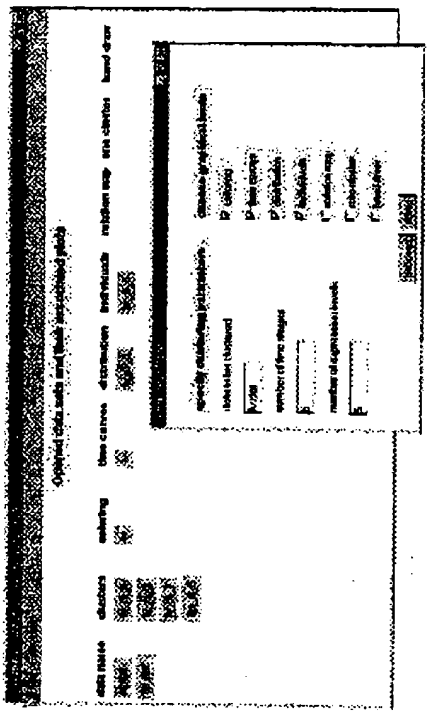


Figure 20

FIG. 5 is a flowchart of a preferred embodiment of the systems of the present invention that shows the clustering of processed GED through Grid Clustering .

Drawing Description Text - DRTX (7):

FIG. 6 is a flowchart of another preferred embodiment of the systems of the present invention that shows the clustering of processed GED through .sigma.-.tau. Clustering .

Drawing Description Text - DRTX (12):

FIG. 11 presents a screen display of the distribution of clustered genes on a grid with 5 time stages and 5 expression levels, where the geometric shape of the cluster is quantitatively described by the cluster name.

Drawing Description Text - DRTX (13):

FIG. 12 presents a screen display of a representative GUI wherein a user scrolls through individual clusters to examine the accuracy of clustering or to search for particularly shaped time curves.

Drawing Description Text - DRTX (14):

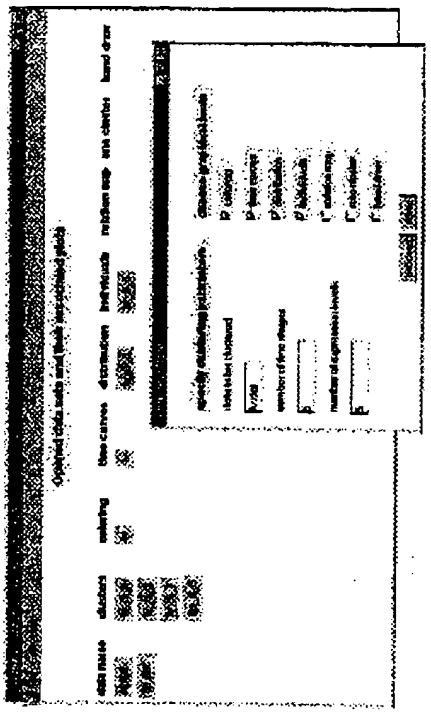


Figure 20

FIG. 13 presents a screen display of a representative clustering for a 5-3 grid and clustering for a 5-7 grid.

Drawing Description Text - DRTX (16):

FIG. 15 presents a screen display of a representative GUI for viewing .sigma.-.tau. clustering, as well as time curves for the selected gene.

Drawing Description Text - DRTX (19):

FIG. 18 presents a screen display of a representative GUI that allows side by side comparison of clustering profiles for two genes.

Drawing Description Text - DRTX (21):

FIG. 20 presents a screen display of a representative main system window, containing tools for tracking input data and associated clustered data sets. The displayed pop-up window provides a GUI wherein the user can select clustering parameters and graphical tools.

Detailed Description Text - DETX (6):

The present invention relates to a system for analyzing gene expression data.

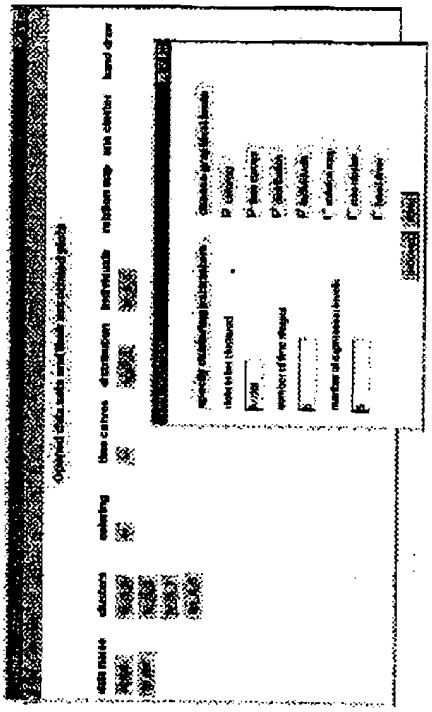


Figure 20

EAST Browser - L17: (3) display73 ss... | US 6263287 B1 | Tag: S | Doc: 2/3 | Format : KWIC

File Edit View Tools Window Help

Detailed Description Text - DETX (52):

In this representation, the window contains scrollable panels for the text properties associated with each gene. Such properties preferably include the presentation of clone ID, major class, subclass and description. One can selectively color and mark one or any number of genes by highlighting the genes in a panel, which preferably are specified from the property selection list at the top of the window. For each gene, the color and mark symbol also may be specified from the color and symbol selection lists at the top of the window. Each highlighted time curve also may be dehighlighted by selecting the corresponding highlighted gene in the specified property scrollable panel. Indeed, any of these properties displayed on the browser may be hyperlinked.

Detailed Description Text - DETX (53):

In a preferred embodiment, a click on the black reset button at the upper right corner serves to remove all highlights . Since the panels can be independently scrolled, a gene index column may be provided for tracking their relative positioning.

Detailed Description Text - DETX (54):

U.S. Patent Jul. 17, 2001 Sheet 20 of 20 US 6,263,287 B1

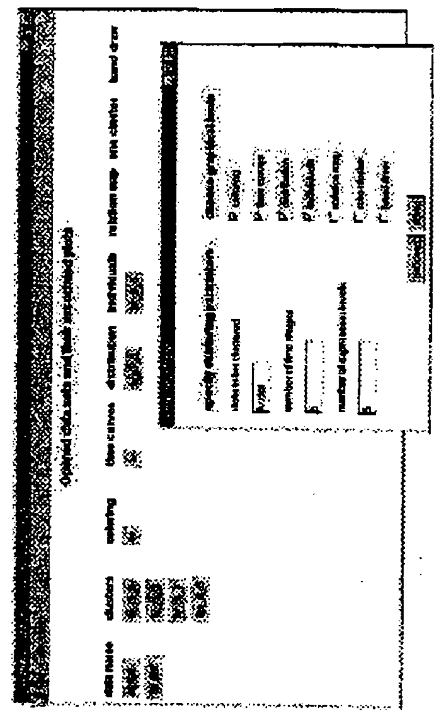


Figure 20

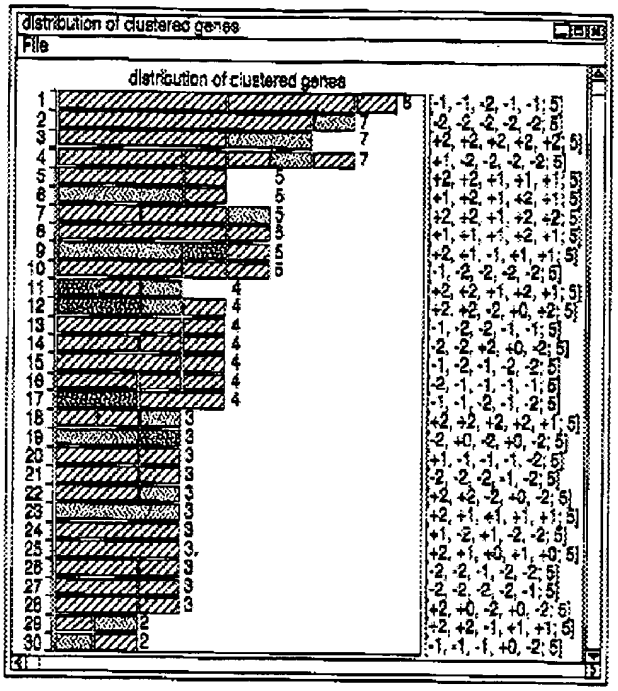
Detailed Description Text - DETX (54):

F. Presenting Distributions of Clustered Genes

Detailed Description Text - DETX (55):

A representative distribution of clustered genes on a grid with 5 time stages and 5 expression levels is presented in FIG. 11. FIG. 11 presents a screen display of the distribution of clustered genes on a grid with 5 time stages and 5 expression levels, where the geometric shape of the cluster is quantitatively described by the cluster name. Again, for each gene, the color and mark symbol also may be specified from the color and symbol selection lists at the top of the window. Each highlighted time curve also may be dehighlighted by double clicking the corresponding highlighted gene in the specified property scrollable panel. Indeed, any of these properties displayed on the browser may be hyperlinked. There are 201 clusters (only the top 30 are shown), each represented by a bar. The length of a bar preferably may be proportional to the size of the cluster, which is labeled at the end of the bar. In a preferred embodiment, some of the bars consist of several colored bands, each representing a major class of genes as provided in FIG. 9. The length of each color band preferably may also be proportional

FIG. 11



Detailed Description Text - DETX (64):

Another aspect of the systems of the present invention preferably provides an interactive graphical tool for presenting .sigma.-.tau. clustering. Referring to FIG. 15, in a preferred embodiment there are text fields at the top of the window. Specifically, FIG. 15 presents a screen display of a representative GUI for viewing .sigma.-.tau. clustering, as well as time curves for the selected gene. The first three fields depicted allow one to specify a set of expression data for clustering, the maximum amplitude of the time shift and the expression level. The last field allows one to search for genes whose description property contains a specific key word. By clicking on the search for keyword button, one can re-arrange all the key word containing genes to the top of the description panel. To perform .sigma.-.tau. clustering, one chooses a reference time curve, to which other time curves are compared, by highlighting a row in the scrollable description panel.

Detailed Description Text - DETX (65):

In a representative example of the systems of the present invention, when the rat brain natriuretic peptide gene (No. 52) is highlighted, 13 color squares of 26 genes are displayed on the .sigma.-.tau.

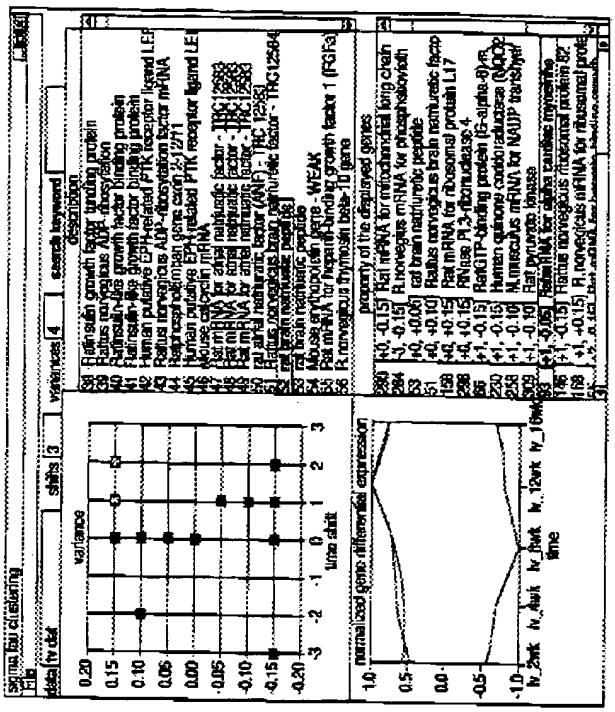


FIG. 15

Detailed Description Text - DETX (65):

In a representative example of the systems of the present invention, when the rat brain natriuretic peptide gene (No. 52) is highlighted, 13 color squares of 26 genes are displayed on the .sigma.-.tau. plot with a shift range of 3 and variance range of 4. The squares may be colored according to their major classes, with the square at the (0, 0) grid point corresponding to the highlighted gene itself. The (.tau.,.sigma.) coordinates and description of the genes displayed in the .sigma.-.tau. plot preferably are listed in the displayed genes panel. In a preferred embodiment, by highlighting a row in the displayed genes panel, one can view the time curves in the normalized differential gene expression panel: the time curve highlighted in the description panel (e.g., pink), the time curve highlighted in the normalized differential gene expression panel (e.g., gray) and its transform (e.g., blue). FIG. 15 presents a representative .sigma.-.tau. plot after changing the shift and variance text fields. Specifically, the transform curve in FIG. 15 represents the normalized curve after a time shift and a vertical flip. The near perfect overlap of the time and transformed curves suggests a potential time-shifted negative correlation between rat brain natriuretic peptide (No. 52) and alpha cardiac myosin heavy chain (No.

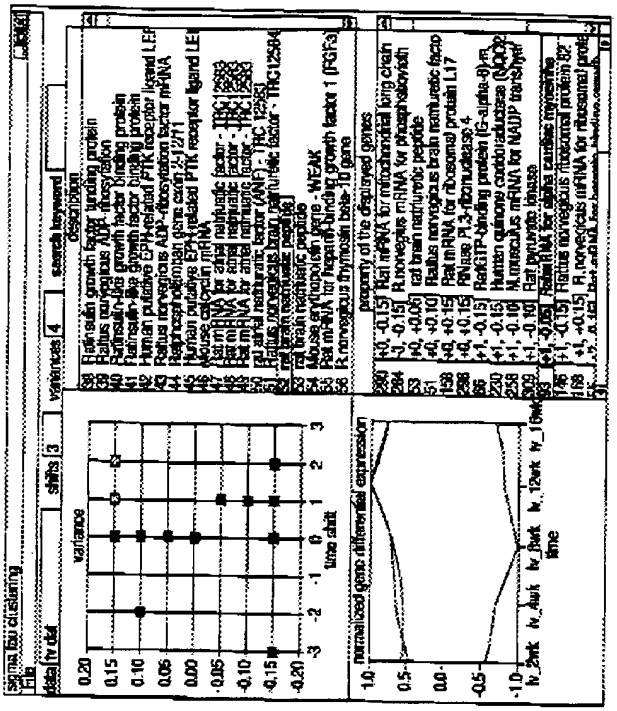


FIG. 15

graphical tools. In this particular format, there are a number of scrollable panels. For each gene, the first panel preferably displays the cluster name in the left ventricle, the septum and the difference between two clusters, whereas the remaining panels preferably display the text properties of the genes. A gene index column preferably is included in the panel to assist tracking of specific genes when the lists are independently scrolled.

Detailed Description Text - DETX (75):

Due to the inherent round-off error of any grid clustering, two time curves of a similar shape sometimes fall into different clusters. In such cases, it may be preferable to view the actual difference between the curves to check the accuracy or inaccuracy of clustering. This can be accomplished in this presentation format by highlighting a gene in the first panel. A pop-up window will subsequently display the two time curves: the left ventricle and septum. Multiple highlightings are preferably provided (two are shown in FIG. 19). De-highlighting the corresponding genes in the first panel can close the pop-up windows.

Detailed Description Text - DETX (77):

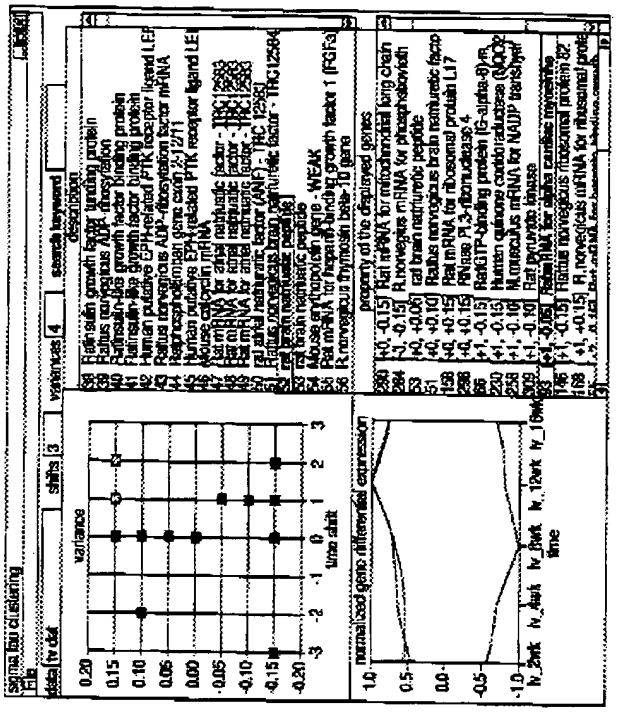


FIG. 15

EAST Browser - L15: (4) display$3sam... | US 6252597 B1 | Tag: S | Doc: 3/4 | Format : KWIC

File Edit View Tools Window Help

A graphical user interface provides a scalable information structure. Interactive categories are displayed as expansive locations on a display as part of a desktop. In a first preferred embodiment of the invention, each category in a tier of an information structure occupies a dedicated expansive location in a list displayed within a defined region on the display. A location occupied by a selected category is expanded or compressed to display the next tier in the information hierarchy as a list, or as a cluster. Remaining locations are resized to accommodate newly-displayed contents within the defined region. The list is directly scrolled by selecting and moving locations with a pointing device. In a second, equally preferred embodiment of the invention, expansive locations are displayed as a cluster arrangement. A selected cluster is highlighted and expanded to display the next tier in the information hierarchy as a list, or as a cluster. Any previously-selected cluster is deselected and contracted. An expansive location may include a text descriptor, a test command, or a pictorial icon. Hypertext Markup Language (HTML), Email, or cached WWW page links may also be embedded within a list.

(12) United States Patent
Lokuge

(10) Patent No.: US 6,252,597 B1
(45) Date of Patent: Jun. 26, 2001

(54) SCALABLE USER INTERFACE FOR GRAPHICALLY REPRESENTING HIERARCHICAL DATA

6252957 abs, 17 - tree highlighting

27 very good

So... Do I argue & make it final

or use Martz & Lokuge 345/841, 854

the 103 support

EAST Browser - L16: (4) display13.am | US 6252597 B1 | Tag: S | Doc: 3/4 | Format : FULL

File Edit View Tools Window Help

(27) In a second, equally preferred embodiment of the invention, the expansive locations are displayed as a cluster arrangement. Each cluster includes a plurality of categories, each occupying an expansive location. A selected cluster is highlighted and expanded, while any previously-selected cluster is deselected and contracted. A selected cluster may also be moved to a position of prominence on the computer display, e.g. the center of the display, while the remaining clusters may be moved to positions of subordinance, such as the edges of the computer display. When a category within the cluster is selected, the location is expanded to display the next tier in the information hierarchy. This next tier may be displayed as a list, or as a cluster. The cluster thus provides a series of ripples, where each ripple displays a different level of the information hierarchy. A cluster may also be embedded within a list; and a list may be embedded within a cluster.

(28) An expansive location may include a text descriptor, a test command, or a pictorial icon. Hypertext Markup Language (HTML) links or cached World Wide Web (WWW) pages may also be embedded within a cluster or list.

(29) The invention also provides a dynamically scalable indentation scheme

United States Patent
Patent No.: US 6,252,597 B1
Date of Patent: Jun. 26, 2001

(54) SCALABLE USER INTERFACE FOR GRAPHICALLY REPRESENTING HIERARCHICAL DATA

ABSTRACT

2nd & third clusters are generated
The at least 3rd cluster is altered by at least hi-liting

also be embedded within a list; and a list may be embedded within a cluster .

(28) An expansive location may include a text descriptor, a test command, or a pictorial icon. Hypertext Markup Language (HTML) links or cached World Wide Web (WWW) pages may also be embedded within a cluster or list.

(29) The invention also provides a dynamically scalable indentation scheme that displays deeper levels of a hierarchy with greater indentation and higher levels of the hierarchy with less indentation.

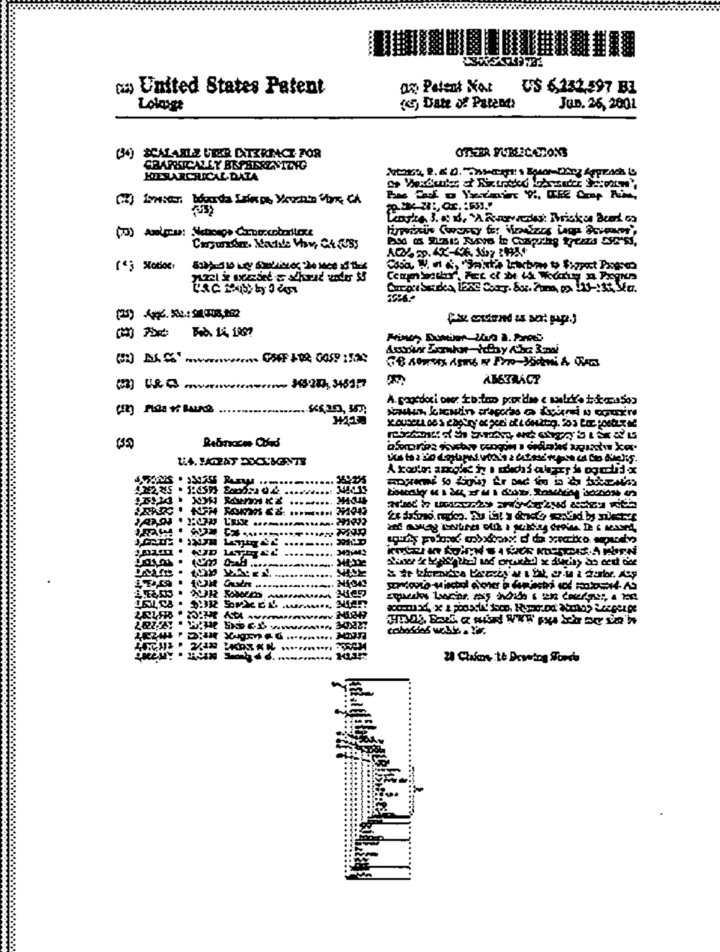
BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a computer system according to the prior art;

FIG. 2 is a front view of a computer display showing a text menu according to the prior art;

FIG. 3 is a front view of a computer display showing pictorial icons according to the prior art;

FIG. 4 is a front view of a computer display showing a first tier of a graphical user interface having a scalable file structure according to a first preferred embodiment of the invention;



EAST Browser - L16: (4) display$3 same ... | US 6252597 B1 | Tag: S,1 | Doc: 3/4 | Format : FULL

File Edit View Tools Window Help

(1) DETAILED DESCRIPTION OF THE INVENTION

(2) The invention provides a graphical user interface (GUI) having a scalable display for showing information, commands, and/or file structures substantially in their entirety. In the invention, interactive categories within lists or clusters are displayed as expansive locations on a computer display of a computer system. Such locations are expanded or compressed upon respective selection or deselection to permit the user to view subcategory information, as well as higher level information. The list may be directly scrolled by selecting a category with a pointing device and by dragging the list to the desired location, for example using drag and drop techniques.

(3) The exemplary embodiment of the invention is considered to be only one of several different display formats in which the invention may be implemented. Thus, the invention can be readily implemented by one skilled in the art in any desired display format, such as Java, html, and C++. The actual generation of the GUI display can be performed using well-known hardware and software techniques.

(4) FIGS. 4 through 8 sequentially show the operation of a first preferred embodiment of the invention. FIG. 4 provides

(12) United States Patent
Lokuge

(10) Patent No.: US 6,252,597 B1
(45) Date of Patent: Jun. 26, 2001

(54) SCALABLE USER INTERFACE FOR GRAPHICALLY REPRESENTING HIERARCHICAL DATA

OTHER PUBLICATIONS

(57) ABSTRACT

EAST Browser - L16: (4) display$3.sam | US 6252597 B1 | Tag: S | 1 | Doc: 3/4 | Format : FULL

File Edit View Tools Window Help

(27) A cluster includes one or more categories, each occupying an expansive location. The categories within an individual cluster are preferably related. For example, the cluster 82 assigned the name "people" shown in FIG. 8 includes pictorial icons 84 representing embedded Email links to co-workers. A cluster is assigned an identifying text descriptor, is represented by a pictorial icon, or both.

(28) When a category within the cluster is selected, its location expands to display the next tier in the information hierarchy. This next tier is displayed as another cluster, or as a list according to the first embodiment of the invention. Similarly, a list may open to display another list or a cluster . In the preferred embodiment of the invention, a cluster is moved on the desktop when it is dragged by a pointer to the desired location.

(29) A desktop display may include a plurality of clusters . In the preferred embodiment of the invention, the display includes an animation module to permit cluster resizing, such as expanding and contracting. Thus, a selected cluster is highlighted and expanded to occupy a larger area on the desktop. Any previously-selected cluster is deselected and contracted. A selected cluster may also be relocated to a more prominent

U.S. Patent Jun. 26, 2001 Sheet 8 of 16 US 6,252,597 B1

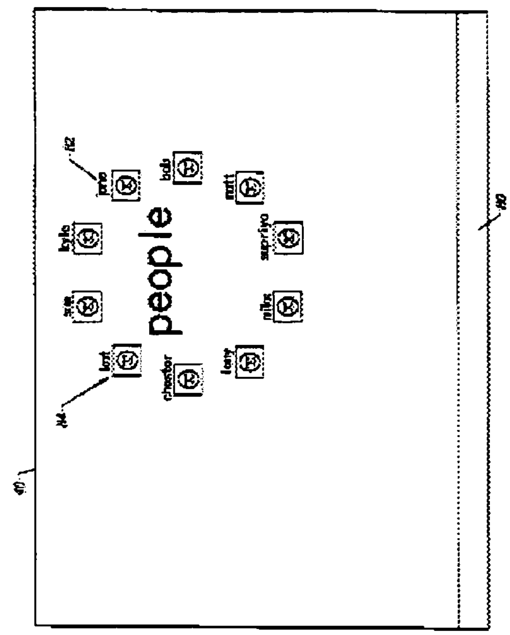


FIG. 8

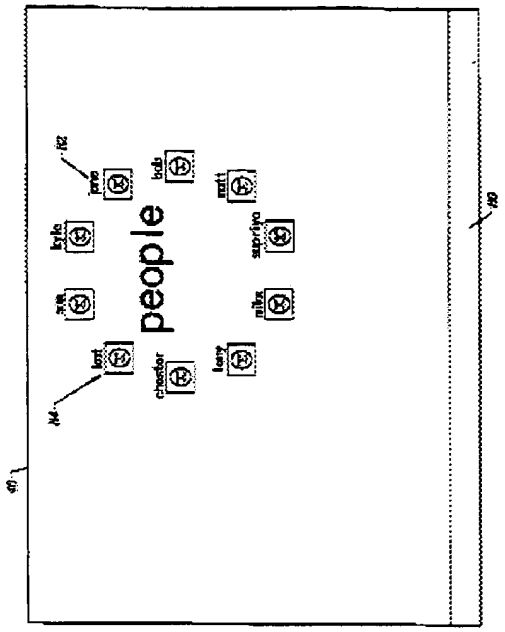
another - expanded clustering

(29) A desktop display may include a plurality of clusters . In the preferred embodiment of the invention, the display includes an animation module to permit cluster resizing, such as expanding and contracting. Thus, a selected cluster is highlighted and expanded to occupy a larger area on the desktop. Any previously-selected cluster is deselected and contracted. A selected cluster may also be relocated to a more prominent position on the desktop, such as the center of the desktop; while unselected clusters may be relocated to less prominent positions on the desktop, e.g. the periphery of the desktop.

(30) In alternate embodiments of the invention, a selected cluster is highlighted only, expanded only, or is indicated by other means, such as sound or animation. However, the invention may be adapted to permit a plurality of clusters to be selected and expanded at the same time.

(31) While the clusters shown in FIG. 8 are circular, one skilled in the art will readily appreciate that a cluster may take any desired shape. In one embodiment of the invention, the cluster shape is user defined. The user selects the shape, dimensions, or contents of the cluster as desired. In another embodiment of the invention, the shape of the cluster is pre-defined by the system software. Similarly, the

FIG. 8

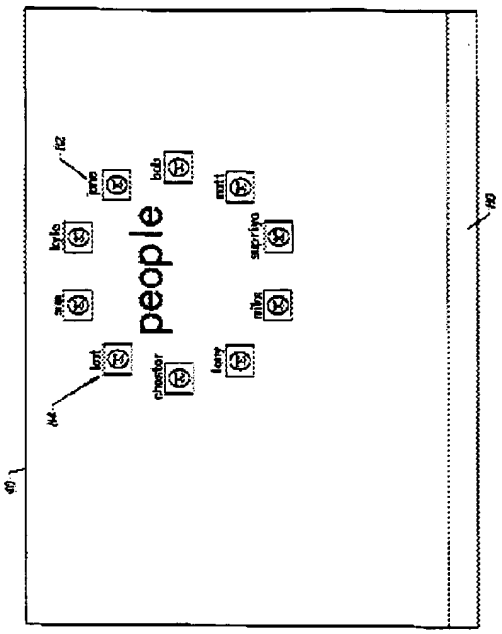


(31) While the clusters shown in FIG. 8 are circular, one skilled in the art will readily appreciate that a cluster may take any desired shape. In one embodiment of the invention, the cluster shape is user defined. The user selects the shape, dimensions, or contents of the cluster as desired. In another embodiment of the invention, the shape of the cluster is pre-defined by the system software. Similarly, the configuration of clusters on a desktop may be user defined, or predefined by the system software.

(32) In one embodiment of the invention, a highlighted cluster displays a table of contents of the cluster. In another embodiment, a highlighted cluster displays a preview of the contents of the cluster. For example, a cluster comprising embedded cached WWW pages displays a preview of the embedded links. This preview may be stored on a computer system database, or on a networked, server connected to the computer system.

(33) Hyperlinks may be embedded in the preview. A user may thereby directly connect to a particular WWW page. This embodiment is advantageous as it permits the user to connect a desired link quickly without first having to connect to the Internet and load the WWW page.

FIG. 8



said defined region, and

wherein the term linear means in a vertical or horizontal direction on said display, and expansion and compression is performed hyperbolically.

17. The structure of claim 16, further comprising:

at least a second expansive location, wherein said second expansive location is compressed in response to the selection of said first expansive location.

18. The structure of claim 16, wherein said scalable information structure comprises a list.

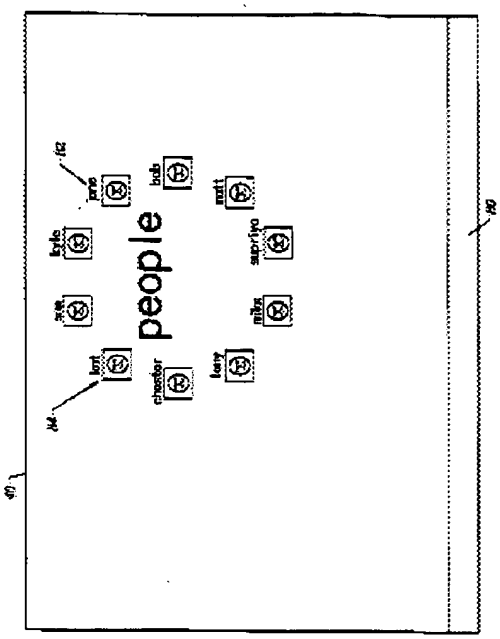
19. The structure of claim 16, wherein said scalable information structure comprises a cluster .

20. The structure of claim 19, wherein animation is used to contract a second cluster display and enlarge said first cluster display upon highlighting or selection of said first cluster .

21. The structure of claim 20, wherein said first cluster is moved to a central portion of said display screen upon selection.

22. The structure of claim 16, wherein a pointing device is used within said defined region to directly select said

FIG. 8



3. The apparatus of claim 1, wherein said scalable information structure comprises a list.

4. The apparatus of claim 1, wherein said scalable information structure comprises at least a first cluster .

5. The apparatus of claim 4, further comprising:

at least a second cluster, wherein, upon highlighting or selection of said first cluster, said second cluster display is contracted and said first cluster is enlarged.

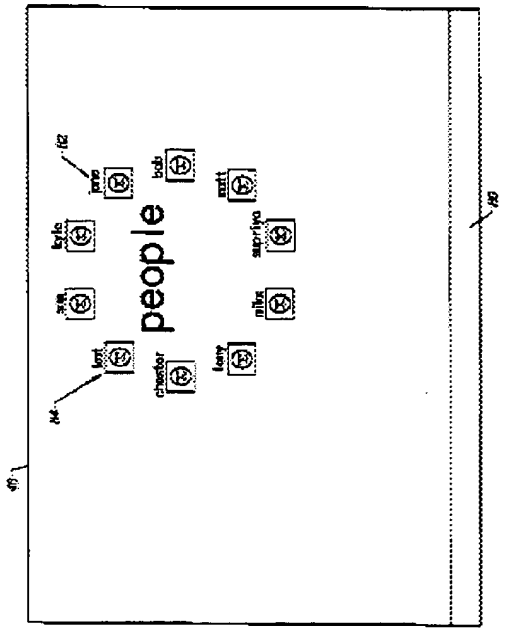
6. The apparatus of claim 4, further comprising:

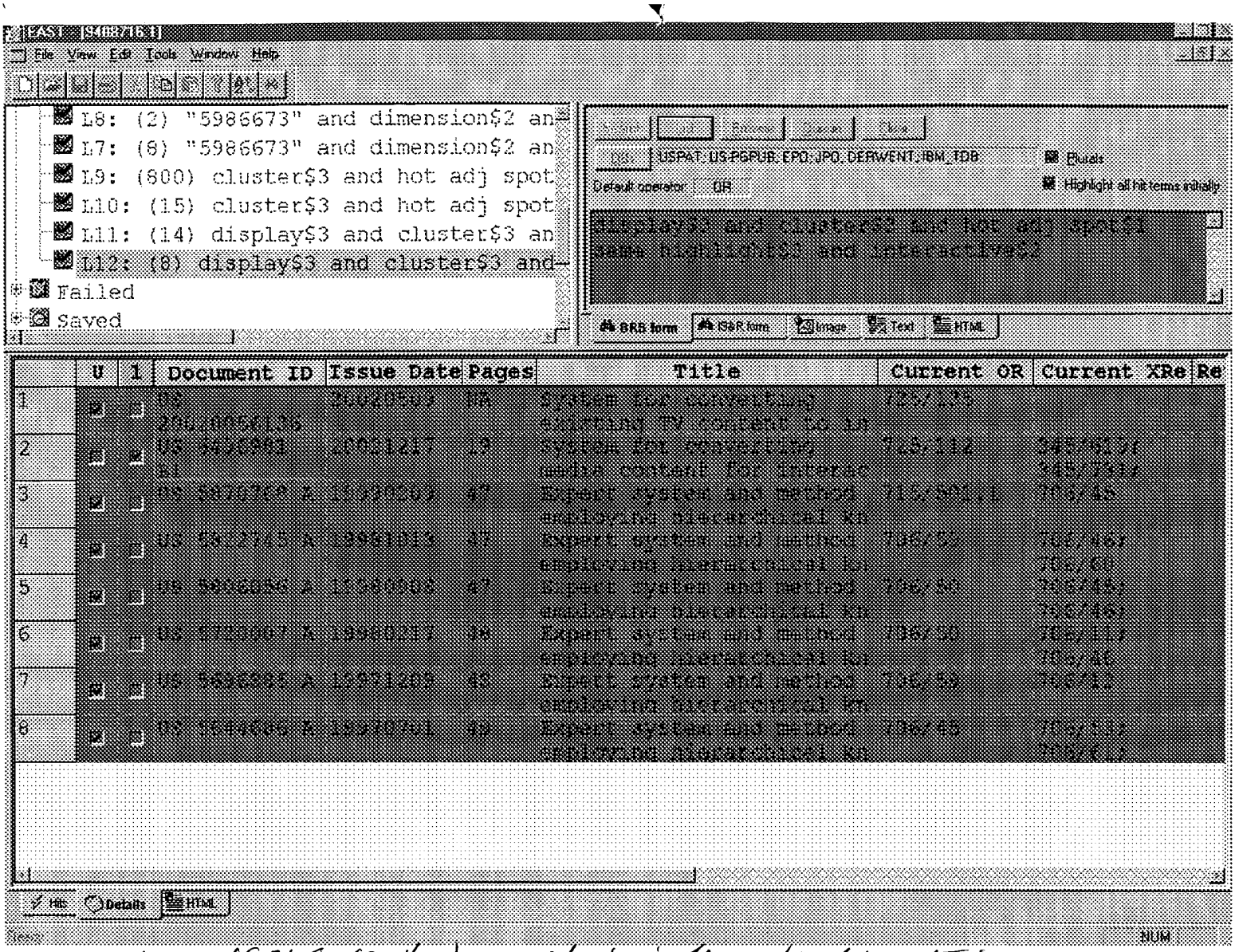
at least a second cluster, wherein, upon highlighting or selection of said first cluster, said first cluster is moved to a central portion of said display screen.

7. The apparatus of claim 1, wherein a pointing device is used to select said expansive location at a first location within said defined region, and to drag said expansive device to a second location.

8. The apparatus of claim 3, wherein the contents of said expansive location comprise a cluster .

FIG. 8





#2 - 15, 31, 51 (Sections) clustering for an object in motion

↓ Segmentation & clustering techniques (not claimed)

↳ Segments

#3 - 164 hotspotting a Link a candidate. -

6263287 Detx 64 + Detx 65